OGY DEPT.

INDIA RUBBER WORLD

OUR 65th YEAR

A BILL BROTHERS PUBLICATION

JANUARY, 1954

PUBLIC LIBRARY
21
DETROIT

CABOT, AS THE WORLD'S ONLY CARBON BLACK MANUFACTURER OF CHANNEL, FURNACE AND THERMAL GRADES...

offers the greatest variety of

NON-STAINING CARBON BLACKS

available to the rubber industry

CABOT

STERLING SO	FEF	Fast Extruding Furnace
STERLING V Non-Staining	GPF	General Purpose Furnace
STERLING NS	SRF	Semi-Reinforcing Furnace
PELLETEX NS	SRF	Semi-Reinforcing Furnace
STERLING MT Non-Staining	MT	Medium Thermal

AND, although Vulcan 3 HAF (High Abrasion Furnace), Vulcan 6 ISAF (Intermediate Super-Abrasion Furnace), and Vulcan 9 SAF (Super-Abrasion Furnace) carbon blacks made from oil are used primarily for their high reinforcement properties, they also possess non-staining characteristics.

GODFREY L. CABOT, INC. BOSTON 10, MASS.

Consider

NEOPRENE TYPE W

for your "general-purpose" requirements

Neoprene Type W has these processing advantages:

√ **STABILITY.** Remarkably stable in respect to changes in viscosity and rate of cure during storage.

√ **RESISTANCE TO MECHANICAL BREAKDOWN.** Processing and molding of low durometer stocks are easier because of greater uncured firmness.

√ **HIGH LOADINGS OF FILLERS AND SOFTENERS.** Substantial loadings are practical—with no loss in processing characteristics—resulting in lower-cost compounds.

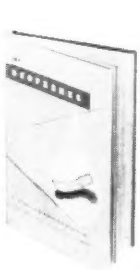
√ **EXCELLENT MILLING AND CALENDERING PROPERTIES**

... and these advantages in the vulcanizate:

- **Low compression set.**
- **Excellent heat resistance (when specifically compounded).**
- **Low-cost, highly loaded compounds that have remarkably good physical properties.**
- **Bright colors with small pigment quantities.**

For complete information

on Neoprene Type W, as well as Neoprene Type WRT, refer to pages 41-86 in our book, "The Neoprenes." You'll find Neoprene Type WHV covered in our Report BL-249. Or get in touch with your Du Pont Rubber Chemicals representative, who will be glad to discuss with you *all* the advantages of these "general-purpose" neoprenes.



DISTRICT OFFICES:

Akron 8, Ohio, 40 E. Buchtel Ave..... POrtage 2-8461
Atlanta, Ga., 1261 Spring St., N. W...... EMerson 5391
Boston 5, Mass., 140 Federal St. ..... HAncock 6-1711
Chicago 3, Ill., 7 South Dearborn St... ANdover 3-7000
Detroit 35, Mich., 13000 West 7-Mile Rd. UNiversity 4-1963
Houston 4, Texas, 4141 Dennis St....... ATwood 4565
Los Angeles 58, Cal., 2930 E. 44th St..... LOgan 5-6464
New York 13, N. Y., 40 Worth St. .... COrtlandt 7-3966
Wilmington 98, Del., 1007 Market St..... Wilm. 4-5121

DU PONT RUBBER CHEMICALS

DU PONT
REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING ... *THROUGH CHEMISTRY*

India RUBBER WORLD, January, 1954, Vol. 129, No. 4. Published monthly by BILL BROTHERS PUBLISHING CORP. Office of Publication, 1309 Noble Street, Philadelphia, Pa., with Editorial and Executive Offices at 386 Fourth Avenue, New York 16, N. Y., U.S.A. Entered as Second Class Matter at the Post Office at Philadelphia, Pa., under the act of March 3, 1879. Subscription United States and Mexico, $5.00 per year; Canada, $6.00; All other Countries $7.00; Single Copies 50 cents. Address Mail to N. Y. Office.

News about

B. F. Goodrich Chemical *raw materials*

These 4 "Cold" Hycar Rubbers meet every tough-job need

THESE "cold" polymerized types of Hycar rubber have a host of applications, especially where toughest conditions must be met. Each offers specific advantages, that can help you improve or develop more saleable products. Check over each one, and write us for helpful, technical information on your specific requirements. Please write Dept. HA-1, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

Hycar 1041	***High acrylonitrile copolymer.*** Easy processing, excellent oil and solvent resistance. Used for oil well parts, fuel cell liners, fuel hose, rolls, lathe cut gaskets, packings, "O" rings, etc.
Hycar 1042	***Medium acrylonitrile copolymer.*** Easy processing, very good oil and solvent resistance, good water resistance, excellent solubility. Used for shoe soles, kitchen mats, printing rolls, "O" rings, gaskets, etc. GR-S and vinyl resin modifications, adhesives and cements.
Hycar 1043	***Medium low acrylonitrile copolymer.*** Easy processing, good oil and solvent resistance, very good low temperature properties. Used for gaskets, grommets, "O" rings, hose and other applications which require improved low temperature properties.
Hycar 1432	***Crumb form—Medium acrylonitrile copolymer.*** Directly soluble—no milling required. Used for cements and adhesives.

B. F. Goodrich Chemical Company

A Division of The B. F. Goodrich Company

Hycar Reg. U. S. Pat. Off.

American Rubber

GEON polyvinyl materials • HYCAR American rubber • GOOD-RITE chemicals and plasticizers • HARMON colors

For Tires, or Belts, or Rubber Shoes There's a PHILBLACK* you should use!

Each PHILBLACK is a specialist in a particular field.

For better extruded or molded products, use PHILBLACK A. This easy-mixing FEF (Fast Extrusion Furnace) black makes processing easy. You get smooth, fast tubings and excellent physical characteristics. Molds come out true to the die, with fewer rejects.

For improved abrasion resistance and long flex life, try PHILBLACK O, the HAF (High Abrasion Furnace) black that is the choice of manufacturers who stress quality and service. PHILBLACK O is a general industry favorite.

For extra long wear at moderate cost, use PHILBLACK I, the popular new ISAF (Intermediate Super Abrasion Furnace) black which is rapidly gaining favor with makers of premium cold rubber passenger tires. PHILBLACK I may be substituted part for part for HAF blacks.

For *super* durability use PHILBLACK E. This SAF (Super Abrasion Furnace) black is the toughest black on the market. PHILBLACK E is ideal for applications where extreme abrasion resistance and ability to withstand aging, cracking, cutting and chipping are of major importance.

For full information consult our technical sales representative or write our nearest office.

PHILLIPS CHEMICAL COMPANY

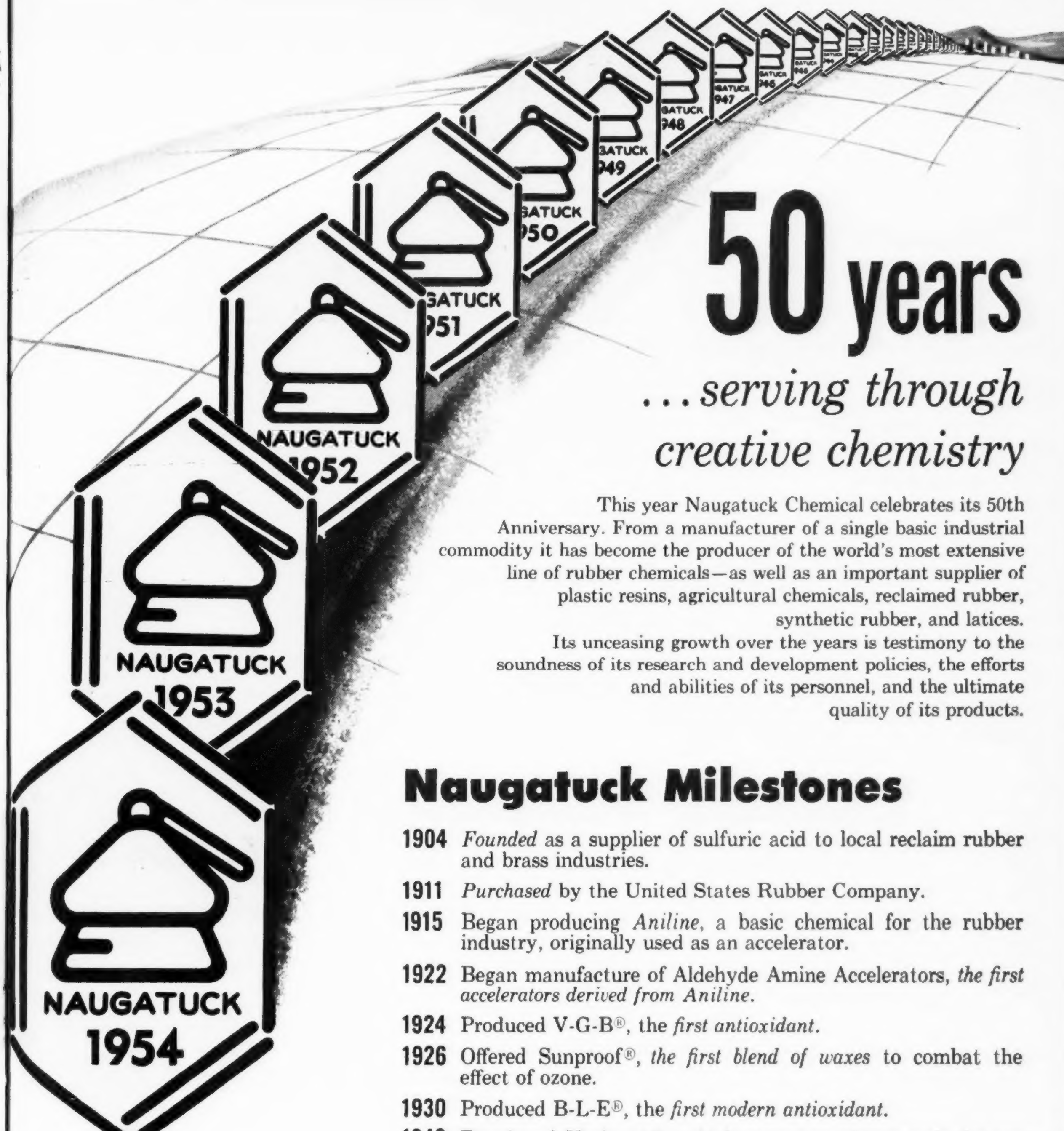
PHILBLACK SALES DIVISION

318 WATER STREET • AKRON 8, OHIO

PHILBLACK EXPORT SALES DIVISION • 80 BROADWAY • NEW YORK 5, N. Y.

* A Trademark

The Philblacks are manufactured at Borger, Texas. Warehouses in Akron, Boston, Chicago, and Trenton. West Coast agent: Harwick Standard Chemical Company, Los Angeles. Canadian agent: H. L. Blachford, Ltd., Montreal and Toronto.



50 years

...serving through creative chemistry

This year Naugatuck Chemical celebrates its 50th Anniversary. From a manufacturer of a single basic industrial commodity it has become the producer of the world's most extensive line of rubber chemicals—as well as an important supplier of plastic resins, agricultural chemicals, reclaimed rubber, synthetic rubber, and latices.

Its unceasing growth over the years is testimony to the soundness of its research and development policies, the efforts and abilities of its personnel, and the ultimate quality of its products.

Naugatuck Milestones

1904 *Founded* as a supplier of sulfuric acid to local reclaim rubber and brass industries.

1911 *Purchased* by the United States Rubber Company.

1915 Began producing *Aniline*, a basic chemical for the rubber industry, originally used as an accelerator.

1922 Began manufacture of Aldehyde Amine Accelerators, *the first accelerators derived from Aniline.*

1924 Produced V-G-B®, the *first antioxidant.*

1926 Offered Sunproof®, *the first blend of waxes* to combat the effect of ozone.

1930 Produced B-L-E®, the *first modern antioxidant.*

1949 Developed Kralac A®, a *high styrene copolymer resin* for use in rubber compounding.

1951 Introduced Celogen, a *nitrogen blowing agent* for both rubber and plastic sponge.

1952 / 1953 Developed Octamine, an *antioxidant* providing *maximum protection* with *minimum discoloration.*

THE FUTURE?

More and better rubber chemicals for more and better rubber products.

Naugatuck Chemical

Division of UNITED STATES RUBBER COMPANY
131 Elm St., Naugatuck, Conn.

IN CANADA NAUGATUCK CHEMICALS DIVISION • Dominion Rubber Company, Limited, Elmira, Ontario

Rubber Chemicals • Aromatics • Synthetic Rubber • Plastics • Agricultural Chemicals • Reclaimed Rubber • Latices

TOUGHEST RESIN EVER—

new, heat-resistant Plio-Tuf

Whether you use a hammer or an Izod Impact Tester, you'll find you can't beat the unusually heat-resistant PLIO-TUF resins for toughness. And you'll also find these high styrene copolymers are hard, rigid, light in weight, light in color, low in water absorption and electrically and chemically resistant.

The PLIO-TUF resins are virgin resins—not blends with rubber. They can be used alone, blended with each other or dispersed in various rubbers to increase their hardness, tensile strength or heat resistance. These unique resins, and their blends, are easily compounded—do not require curing—can be mixed, calendered, extruded or molded on conventional rubber or plastics processing equipment.

The extreme toughness of the PLIO-TUF resins offers two outstanding advantages. First it permits you to meet impact resistance requirements previously beyond the range of all nonreinforced plastics. And second, it permits you to lower compound costs through the use of fillers, while still maintaining above average impact strength.

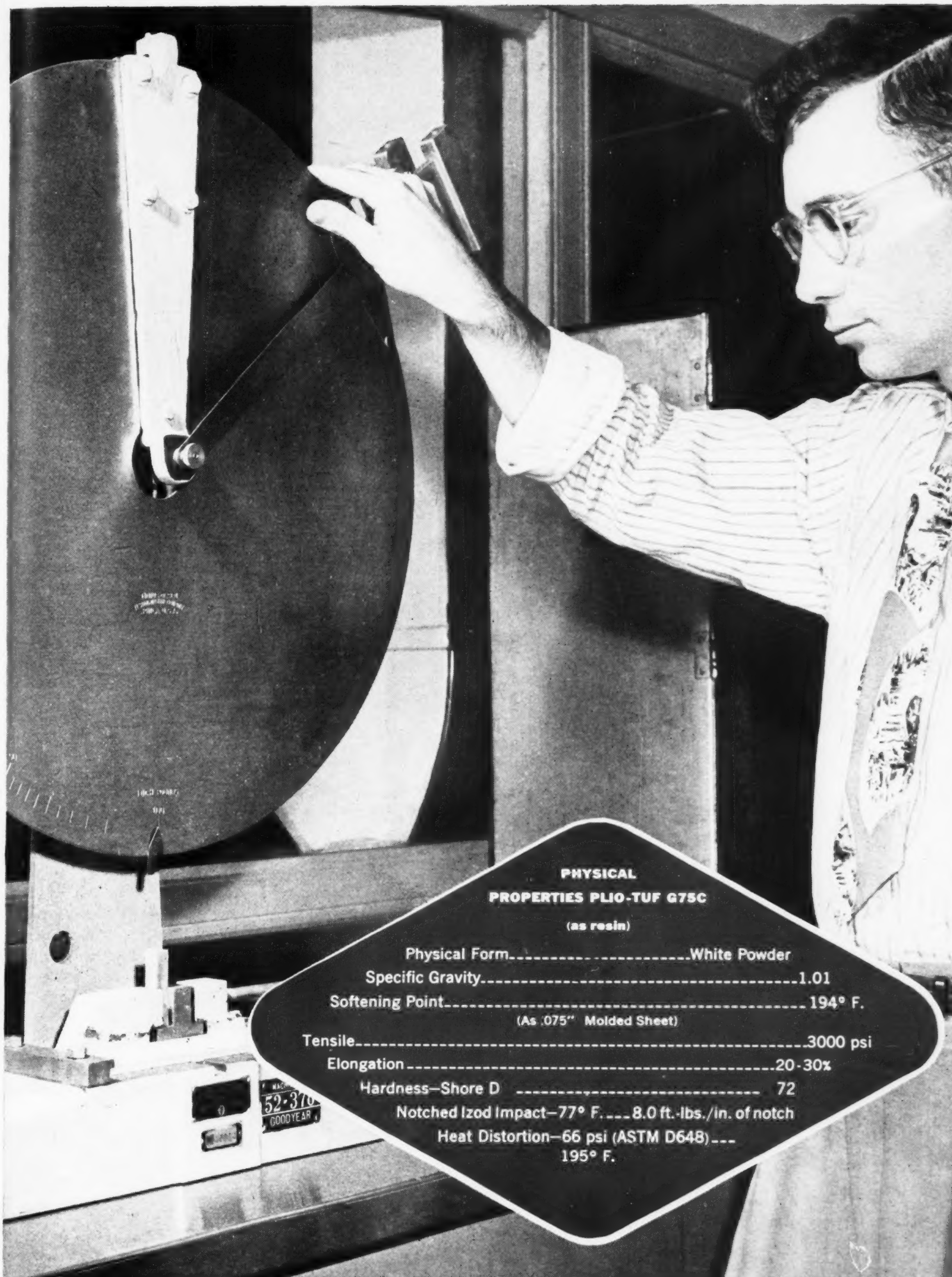
All in all, the unusual physical properties of the PLIO-TUF resins, coupled with their ease of processing and excellent working characteristics, offer intriguing possibilities for new products in new fields using existent equipment. Once compounded and preformed, they can be readily post-formed and drilled, punched, tapped, turned, sawed, sewed, cemented or otherwise fabricated and finished into an almost limitless number of items.

Samples, literature and full technical help on the PLIO-TUF resins are yours by writing to:

Goodyear, Chemical Division, Akron 16, Ohio

CHEMICAL
GOODYEAR
DIVISION

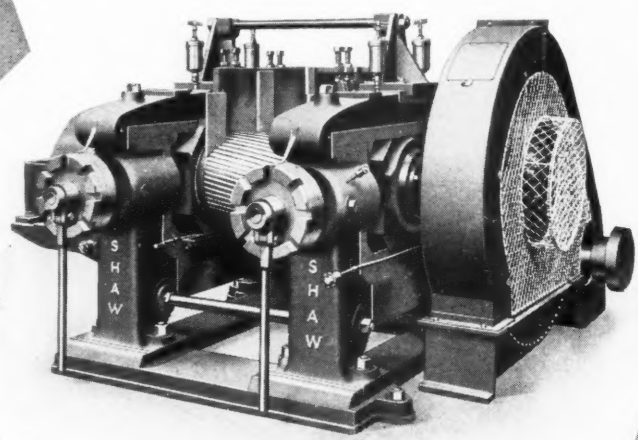
Use-Proved Products—CHEMIGUM · PLIOBOND · PLIOLITE · PLIO-TUF · PLIOVIC · WING-CHEMICALS—The Finest Chemicals for Industry



SWINGING PENDULUM of this Izod Impact Tester points up the unmatched toughness of the PLIO-TUF resins, which is but one of their many unusual properties.

We think you'll like "THE GREATEST STORY EVER TOLD"—every Sunday—ABC Radio Network—THE GOODYEAR TELEVISION PLAYHOUSE—every other Sunday—NBC TV Network
Chemigum, Pliobond, Pliolite, Plio-Tuf, Pliovic—T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

get cracking



A 24″ x 20″ Cracker with chilled-cast iron rolls, steel beds, frames, caps and bearing blocks, for cracking down raw rubber prior to mastication or for use in conjunction with a line of warming mills.

SHAW

THERE IS A COMPLETE RANGE OF SHAW CALENDERS, GRINDERS, REFINERS, MIXERS AND WARMING MILLS FOR THE RUBBER INDUSTRY.

FRANCIS SHAW & COMPANY LIMITED, MANCHESTER 11, ENGLAND

LONDON OFFICE: 34 VICTORIA STREET, LONDON S.W.1

Enquiries to Francis Shaw (Canada) Ltd., Grahams Lane, Burlington, Ontario, CANADA

2864

AUTOMATIC
bag filling and weighing

. . . guarantees Pelletex SRF uniform, correct weight to the last ounce. The superior pellet quality of Pelletex further guarantees that the last ounce of black will flow from the bottom of the bag, leaving no residue behind. Pelletex pellets are uniformly well-formed, grit-free, free-flowing and easy to handle, in bag or bulk. This results in less dust in mixing, less danger of contamination. Weighing is quicker and more accurate, and results in better standard SRF-compounded stocks.

GENERAL ATLAS DIVISION
of Cabot Carbon Company

GODFREY L. CABOT, INC.
77 Franklin Street, Boston 10, Massachusetts

CABOT

PELLETEX

For 3-DIMENSIONAL Film

OR SHEET • COATINGS • EXTRUSIONS • CASTINGS

Improved **HARFLEX 500®**

will make your product

STAND OUT

for RESISTANCE TO WATER EXTRACTION

EXCELLENT HEAT STABILITY

BETTER LOW TEMPERATURE FLEXIBILITY

HARFLEX 500®

HARDESTY

Inquiries for our *improved* HARFLEX 500® are invited. Our technical staff is at your disposal.

BINNEY & SMITH CO. • Distributor to the Rubber Industry

HARCHEM

41 EAST 42nd STREET, NEW YORK 17, N. Y.

THE KEY TO HARCHEM® BETTER PLASTICS

HARDESTY CHEMICAL DIVISION
W. C. HARDESTY CO., INC.

Manufacturers of Sebacic Acid

Canadian Distributor: W. C. Hardesty Co. of Canada Ltd., 975 Lakeshore Road, New Toronto, Canada

SCORE CARD FOR SUPERIOR PRODUCTS: Point by point reasons for reinforcing rubber with PLIOLITE S-6B in the most important applications. Numbers indicate relative significance of properties imparted to particular use.

	Hardness	Stiffness	Reinforcement	Electrical Properties	Hot Tear	Low Gravity	Reduce Shrinkage	Processing	Non-Discoloration	Aging
High Grade Shoe Soles	3	2	5			1	7	6	4	8
Medium Grade Soles	2	1	3		6			5	4	7
Cheap Soles	1				3			2	4	5
Inner Soles	1	2			4	3			5	6
Blown Soling			3		1			2	4	
Flooring	1				2			3	4	5
Electrical Insulation			4	1			3	2		5
Synthetic Leathers	See soling tabulations									
Hard Rubber	1	2								
Extrusion Compounds							1	2		
Golf Ball Covers	1	2				3		5	4	
Ball Covers		2	1					4	3	5
Molded Items			2		1		3	4	5	6
High Impact Stocks	1	2							3	4

THE WHY AND WHERE—

of reinforcing rubber with PLIOLITE S-6B

HERE, in quick summary, are the reasons for using reinforcing resins. Here, in rapid-fire order, are the major uses and major functions of such resins in rubber.

What you won't find here are the reasons for using PLIOLITE S-6B rather than similar resins. These, you'll find the first time you try our resin. You'll find PLIOLITE S-6B is the easiest processing, the most thorough dispersing of all the high styrene copolymers. And you'll find PLIOLITE S-6B the best for all-round physical properties.

Write, right now, for literature, samples, full technical assistance on improving rubber with PLIOLITE S-6B. Address: Goodyear, Chemical Division, Akron 16, Ohio.

CHEMICAL GOODYEAR DIVISION

We think you'll like "THE GREATEST STORY EVER TOLD" every Sunday—ABC Radio Network
THE GOODYEAR TELEVISION PLAYHOUSE every other Sunday—NBC TV Network

Chemigum, Pliobond, Pliolite, Plio-Tuf, Pliovic—T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

Use-Proved Products — CHEMIGUM • PLIOBOND • PLIOLITE • PLIO-TUF • PLIOVIC • WING-CHEMICALS — The Finest Chemicals for Industry

STAUFFER SUPPLIES

rubbermaker's sulphurs

CRYSTEX (85% insoluble)
TIRE BRAND (99.5% pure)
Special Purpose Grades
Flowers (30% insoluble)
TUBE BRAND (Refined)

rubbermaker's chemicals

Caustic Soda
Carbon Tetrachloride
Carbon Bisulphide
Sulphur Chlorides

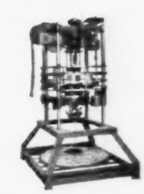
Stauffer CHEMICALS SINCE 1885

STAUFFER CHEMICAL COMPANY

420 Lexington Ave., New York 17, N. Y. • 326 So. Main Street, Akron 8, Ohio
221 No. La Salle Street, Chicago 1, Ill. • 824 Wilshire Boulevard, Los Angeles 14, Calif.
636 California Street, San Francisco 8, California • P.O. Box 7222, Houston 8, Texas
North Portland, Oregon • Weslaco, Texas • Apopka, Florida

WORLD

KNIT your profits
—at high speeds . . .



. . . with Fidelity's method of HOSE reinforcement

You can knit natural and synthetic yarns at speeds up to 1,000 feet per hour on rubber and plastic extrusions in continuous lengths. Hose is strong and *flexible*, adhesion is better, diameters are uniform.

By eliminating costly rewinding, treating and drying operations, electrically controlled Fidelity Hose Reinforcement Machines are setting new economy records in plants where they replace conventional braiders. These machines have been time tested by the world's leading Rubber Hose Manufacturers for nearly 20 years.

Write today for Catalog HR describing advantages and technical details. When in the Philadelphia area, visit the new showroom at our plant and see the Fidelity Hose Reinforcement Machine in operation.

Designers and Builders of Intricate, Automatic Precision Machines

SINCE 1911

FIDELITY MACHINE COMPANY, INC.

3910-18 FRANKFORD AVENUE, PHILADELPHIA 24, PA.

Export Dept.:
25 Beaver Street, New York 4, N. Y.

Canadian Representative:
W. J. Westaway Co., Ltd., Hamilton, Ontario, Canada.

Keep ahead...in product uniformity!

Skellysolve for Rubber and Related Industries

Applications

SKELLYSOLVE-B. For making quick-setting cements for the shoe, tape, container, tire and other industries. Quick-drying, with no foreign taste or odor in dried compound.

SKELLYSOLVE-C. For making quick-setting cements with a somewhat slower drying rate than those compounded with Skellysolve-B.

SKELLYSOLVE-D. For cements and variety of manufacturing operations. Good odor. Quick drying. Minimum of heavy, greasy compounds.

SKELLYSOLVE-H. For general use in manufacturing operations and cements, where faster evaporation rate than that of Skellysolve-D is desired.

SKELLYSOLVE-E. For use wherever a relatively slow drying solvent is desired.

SKELLYSOLVE-R. For general use in tire building and a variety of other manufacturing operations and cements. Reduces evaporation losses. Medium quick final dry. Lessens bloating and skinning tendency.

"Doc" MacGEE says: Keeping your products uniformly high in quality is one sure way to keep your products uniformly high in consumer appeal—and in sales. And if your product's uniformity depends in small or large degree upon the uniformity of your solvents, you'll do well to see what Skellysolve can do for you.

Batch after batch, you'll find that Skellysolve is of the same high specification — exactly what you ordered to fit your special manufacturing processes. The reason? Because Skellysolve is manufactured under the strictest of quality controls — during *every* step of its production at the refinery. Nothing is taken for granted. Constant checks and re-checks police every factor that enters into producing solvents that you can depend on to protect the quality of your product.

That's why Skellysolve invites comparison on all these technical factors: Low end points. Quick evaporation. Reduced blushing tendency. Low vapor pressure. Minimum of unsaturates and decomposition products. And a minimum of low and high boiling compounds.

Special solvent application problem? You're invited to call in the Skellysolve Technical Fieldman for help in solving it. Or, for more complete technical facts on any Skellysolve solvents, write us today.

SKELLY

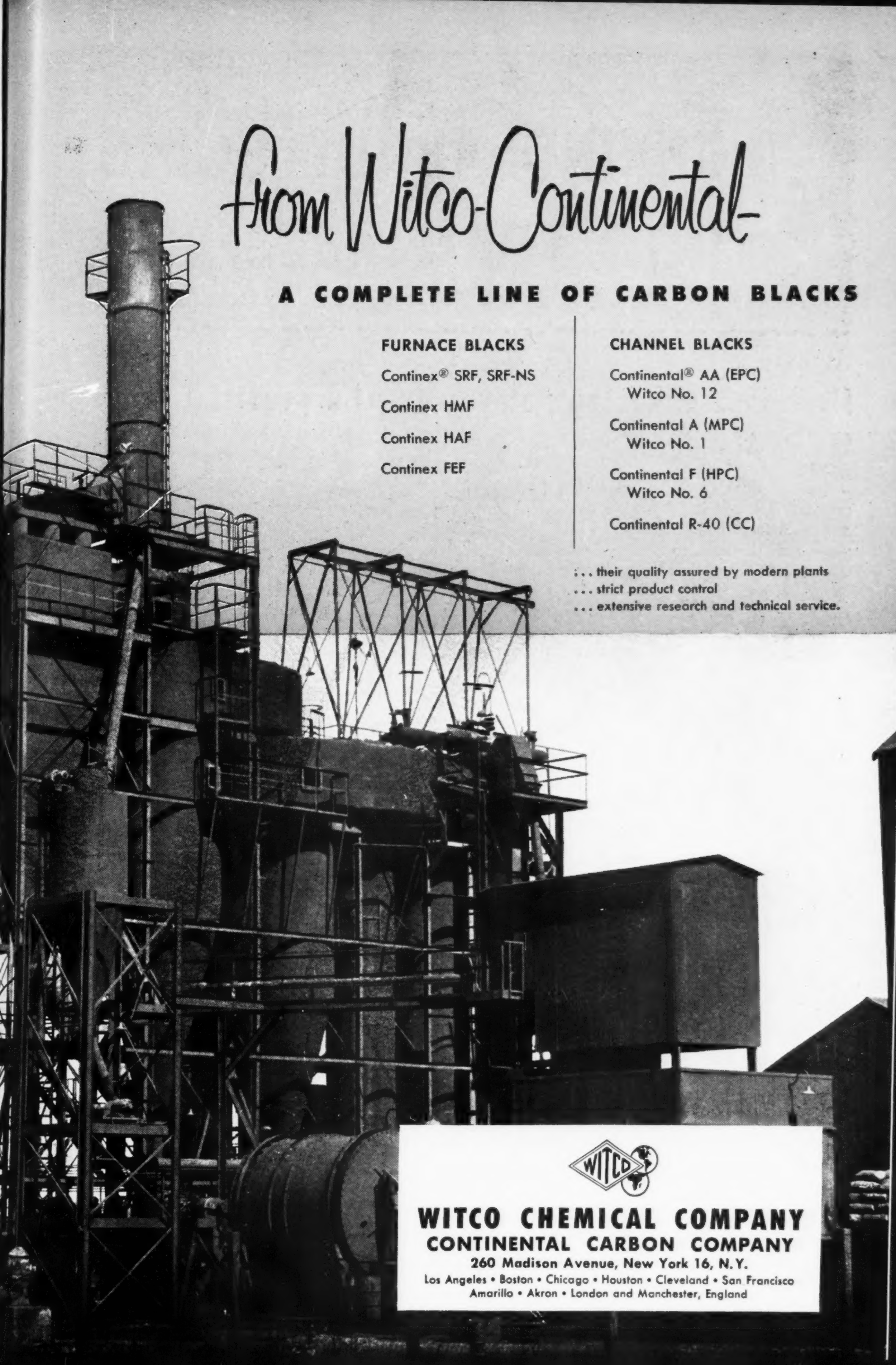
Skellysolve

INDUSTRIAL DIVISION, SKELLY OIL COMPANY
KANSAS CITY, MISSOURI

ctor that
that you
uality of

tes com-
factors:
tion. Re-
w vapor
ates and
a mini-
pounds.

roblem?
ellysolve
solving
cal facts
write us

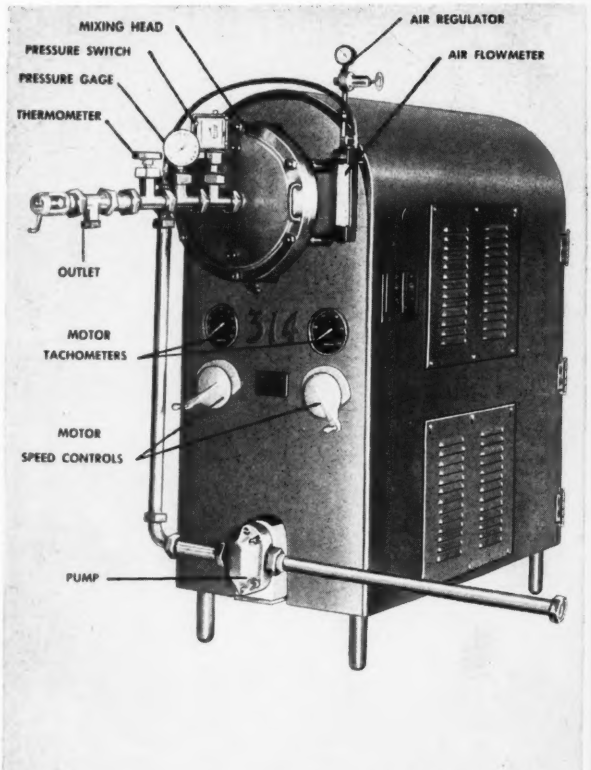


THINKING ABOUT GOING INTO FOAM RUBBER?

Here is a mixer to put you in at a profit!

If you are thinking of making foam rubber products, you certainly want the best equipment available for making the highest quality product at the least cost. One Oakes Continuous Automatic Mixer will do the work of a battery of the old style, conventional batch mixers—in fact it *is* doing it in a long list of representative plants throughout the world.

The reasons for the widespread adoption of Oakes equipment are many. Mixing is continuous and automatic. There are easy, instant push-button controls. Predetermined density can be held uniformly. Production of superlative quality can be had up to 900 pounds per hour with the smaller Oakes model; up to 1800 pounds per hour with the larger. Savings in latex and all other formula materials of as much as 15 per cent have been realized. Savings in reduced "rejects" have been up to 75 per cent. In plants with production upwards of 1000 pounds an hour savings of as many as six persons in labor force have been reported. Less floor space is needed; refrigerated, air-conditioned mixing rooms are unnecessary. These and other features have made this preferred equipment everywhere.



Oakes Continuous Automatic Mixer

Available only through

THE E. T. OAKES CORPORATION

Islip, Long Island, New York

ON

ONLY PICCOLYTE

can offer you:

COLOR—so light that new color standards were made necessary.

ECONOMY—Low in first cost and soluble in low-cost petroleum solvents.

VARIETY—Standard and special grades in melting points from 10° C to 125° C.

NEUTRALITY—Low acid number—less than 1—unsaponifiable.

WATERPROOF—Piccolyte resins are unaffected by water or moisture.

PERMANENCE—Stable and non-yellowing—unaffected by alkalies and salts.

LOW COST made by patented process that permits low selling price.

Write

—for complete data, specifications and samples. Please describe intended use in inquiry.

PICCO

PENNSYLVANIA INDUSTRIAL CHEMICAL CORP. Clairton, Pennsylvania

Plants at Clairton, Pa.; West Elizabeth, Pa.; and Chester, Pa.

Distributed by Harwick Standard Chemical Co., Akron 5, Ohio

Sales Offices in the New York, Chicago, Philadelphia and Pittsburgh districts

Which of these 26 depots ensure YOUR supplies of "HORSE HEAD" ZINC PIGMENTS?

NOT JUST ONE,

but several, of these warehouses guard your requirements for the various brands of Horse Head zinc pigments — wherever you are.

Whether you need a regular L.C.L. shipment or an emergency supply between carloads, you can count on Horse Head warehouses to protect your production schedules.

This is why:

1. The Horse Head distribution system consists of an integrated nationwide network of warehouses:
   - 5 on the Pacific Coast
   - 10 in the Midwest
   - 11 in the East and South
2. An unexpectedly heavy call on any one is promptly met by shipments from one or more of the others nearby.

Thus you get maximum delivery service:

1. Fast deliveries
2. Storage reserve in depth
3. Your choice from the most complete line of zinc pigments

THE NEW JERSEY ZINC COMPANY

Founded 1848

160 Front Street, New York 38, N. Y.

HORSE HEAD PRODUCTS

The Pushcart Expedition

"We're going to Zion with our carts,
And the spirit of God within our hearts."
(Song of the pushcart emigrants.)

Though the incident may be little known today, the pushcart expedition of the late 1850's is one of the most unusual stories in American history. Surely, it is one of the most unique in the annals of transportation of people and their goods.

This endeavor is connected with the early history of the Mormon church, and was devised to bring to the Salt Lake City area at low cost converts gained by the church in England and Europe.

Iowa City was the point of outfit. Here emigrants were given a pushcart, wt. 60 lbs. unloaded, on which to carry their possessions and part of the supplies across the long, intervening stretch of plain and mountains. Only enough ox-teams and wagons were furnished, on a company basis, to haul tents, extra provisions and those who were unable to walk. (When these wagons broke down and became beyond repair, as often happened, their contents were shifted to the pushcarts.) More than 4,000 emigrants reached "Zion" in this manner, one group making the trip in half the time of a wagon train.

How far man has progressed in the century since the pushcart emigrants struggled across almost half a continent. Even such a commonplace article as a bicycle wheel and tire would have seemed like a miracle from "Zion" itself to those who pushed the cumbersome carts. A pair of such tires would have outlasted the hickory and iron of the wheels, taken the weariness from many a mile.

Many factors have contributed to the progress man has made in transporting himself and his products. Speed, however, was made possible with the inflated rubber tire; and today's rubber tire with its built-in strength and long-life, is made possible by carbon black.

UNITED CARBON COMPANY, INC.

Kosmos 20 is the semi-reinforcing (SRF) black of distinction. It is a highly scientific product made with the greatest care. Therefore it is reliably uniform.

Kosmos 20 is finely balanced for cool mixing, easy processing, fast and smooth extrusion, moderate reinforcement, high resilience, low heat build-up, superior aging, and good resistance to flex.

Kosmos 20 is the choice for tire body stocks, butyl tubes, bead insulation, motor mountings, wire jackets, hose, footwear, and thousands of mechanical goods.

United blacks are the bulwark of many rubber items. Depend on United blacks to make your products supreme.

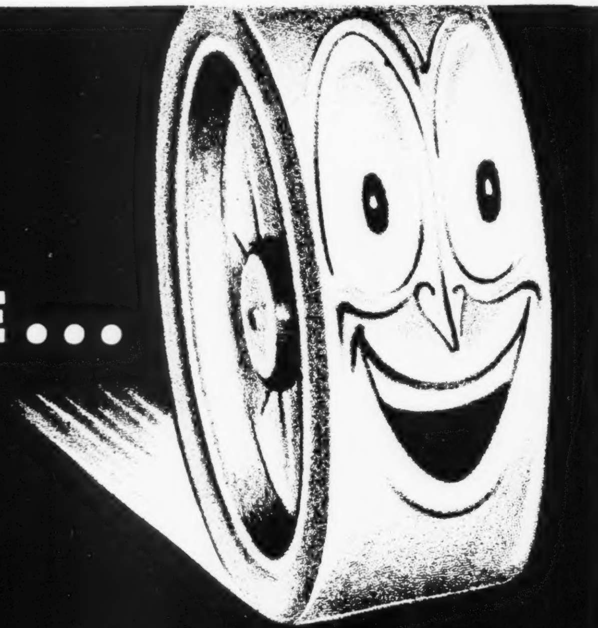
UNITED CARBON COMPANY, INC.

CHARLESTON 27, WEST VIRGINIA

NEW YORK AKRON CHICAGO BOSTON MEMPHIS


TRIM FLASHING in a Flash
and Clean as a Whistle!
Western's RMH Machine
cuts the cost of trimming as much as 75%
a factory in a foot of space!
FEATURES: Cuts on replaceable hardened steel plate. Foot control speeds operation. Simple, positive pressure adjustment. ½ H.P. motor. Cutting area approx. 8½" x 9".
CUTS, PUNCHES and TRIMS in one swift operation!
DIES ARE OUR SPECIALTY
2 and 3 level dies are made for RMH. Change dies in just a few seconds with positive alignment.
FLASHING TRIM DIES
CLICKER DIES
WALKER DIES
I. D. and O. D. DIES
MALLET DIES
MACHINE DIES
POSITIVE SAFETY FEATURES
Machine cannot trip accidentally. Operator can view entire operation.
GET THE FULL STORY on Western Machines and Dies by sending for our free illustrated catalog today.
WESTERN SUPPLIES CO.
SEND SAMPLES of parts to be cut and flash trimmed for our recommendations.
For Versatility— "GO WESTERN"
Western SUPPLIES CO.
2920 CASS AVE., ST. LOUIS 6, MO.

NO TIRED TIRES HERE . . .



EASY PROCESSING

Marbon "8000"

Reinforcing High Styrene Resin

Plasticizes and Reinforces Cold GR-S in the Manufacture of Solid Industrial Tires

- *Can be added directly to your Rubber Compounds!*
- *Contributes Excellent tubing and Molding properties!*
- *Gives increased abrasion and chip-resistance!*
- *Reduces failures from crack-growth!*
- *Blends with Natural, Synthetic and Reclaim Rubbers!*
- *Eliminates prior Masterbatching!*

GET THE FACTS — *Write* TODAY FOR TECHNICAL LITERATURE

Marbon

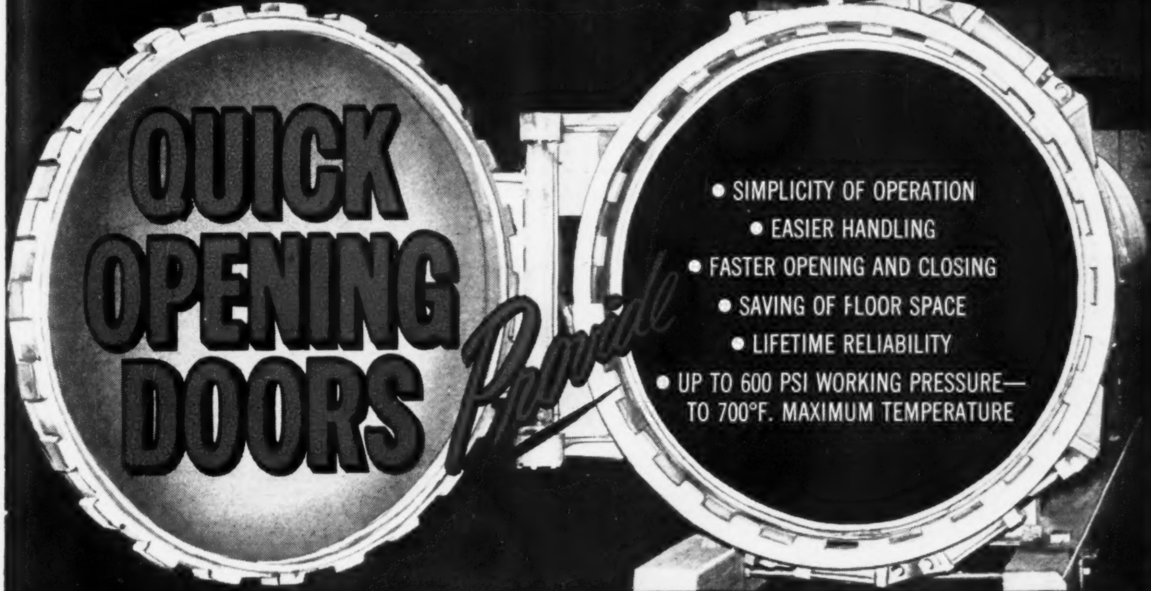
MARBON CORP.

GARY, INDIANA

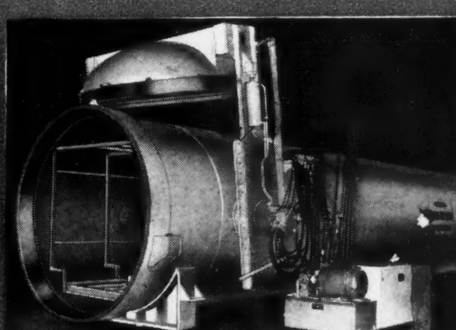
SUBSIDIARY OF BORG-WARNER

It BLENDS as it STRENGTHENS as it IMPROVES

STRUTHERS WELLS

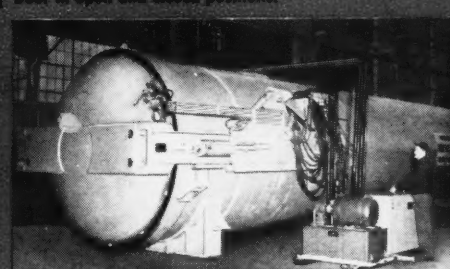


The most important achievements and advancements in design and application for every industry are built into Struthers Wells Quick Opening Doors. Safety devices are incorporated so that pressure cannot be applied to the vessel until the doors are properly closed. Write today for descriptive Bulletin.



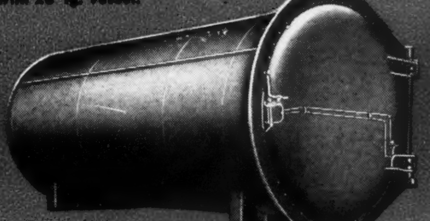
★ OVERHEAD TYPE

These two illustrations show a 10' I.D. x 85' lg. autoclave with hydraulically operated Overhead Type Quick Opening Door in open and closed positions.



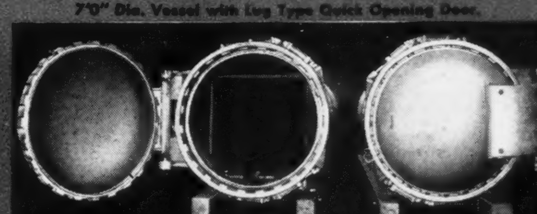
★ HINGED TYPE

12' I.D. Hinged Type Quick Opening Door with 28' lg. vessel.



★ LUG TYPE

7'0" Dia. Vessel with Lug Type Quick Opening Door.



Struthers Wells

Consult Struthers Wells for Quick Opening Doors best suited to your specific requirements.

STRUTHERS WELLS CORPORATION

Process Equipment Division • TITUSVILLE, PA.

Plants at TITUSVILLE, PA. • WARREN, PA. • *Offices in Principal Cities*

Announcing
a Change in Name
from BURGESS CHEMICAL COMPANY—
to CARY CHEMICALS INC.


Kenneth B. Cary, President


George F. Blasius, Executive Vice President and General Manager


Warren D. Sechrist, Vice President and Plant Manager


William W. Howerton, Technical Sales Representative

Cary Chemicals Inc.
Successors to
BURGESS CHEMICAL CO.

Executive Sales Offices
64 HAMILTON STREET
PATERSON 1, NEW JERSEY
LAmbert 5-0232

Laboratory & Plant
RYDERS LANE
MILLTOWN, NEW JERSEY
Milltown 8-1585

At a recent meeting of the directors of the Burgess Chemical Company, at which time the present officers were elected, it was decided that the corporate name of our company should be changed to CARY CHEMICALS INC.

We felt that this new name would more aptly connect our company particularly with the rubber and plastic industries whom our personnel has served through the years.

Although our corporate name has been changed, our standards of high quality and performance of the products manufactured and marketed by our company remain the same.

If your requirements include vinyl compounds, vinyl plasticizers, vinyl resin, reclaiming oils, sun-proofing waxes, esters, stearine pitches, or other related materials used in rubber and plastic compounding, we hope you will give us an opportunity to be of service.

Cordially yours,

CARY CHEMICALS INC.

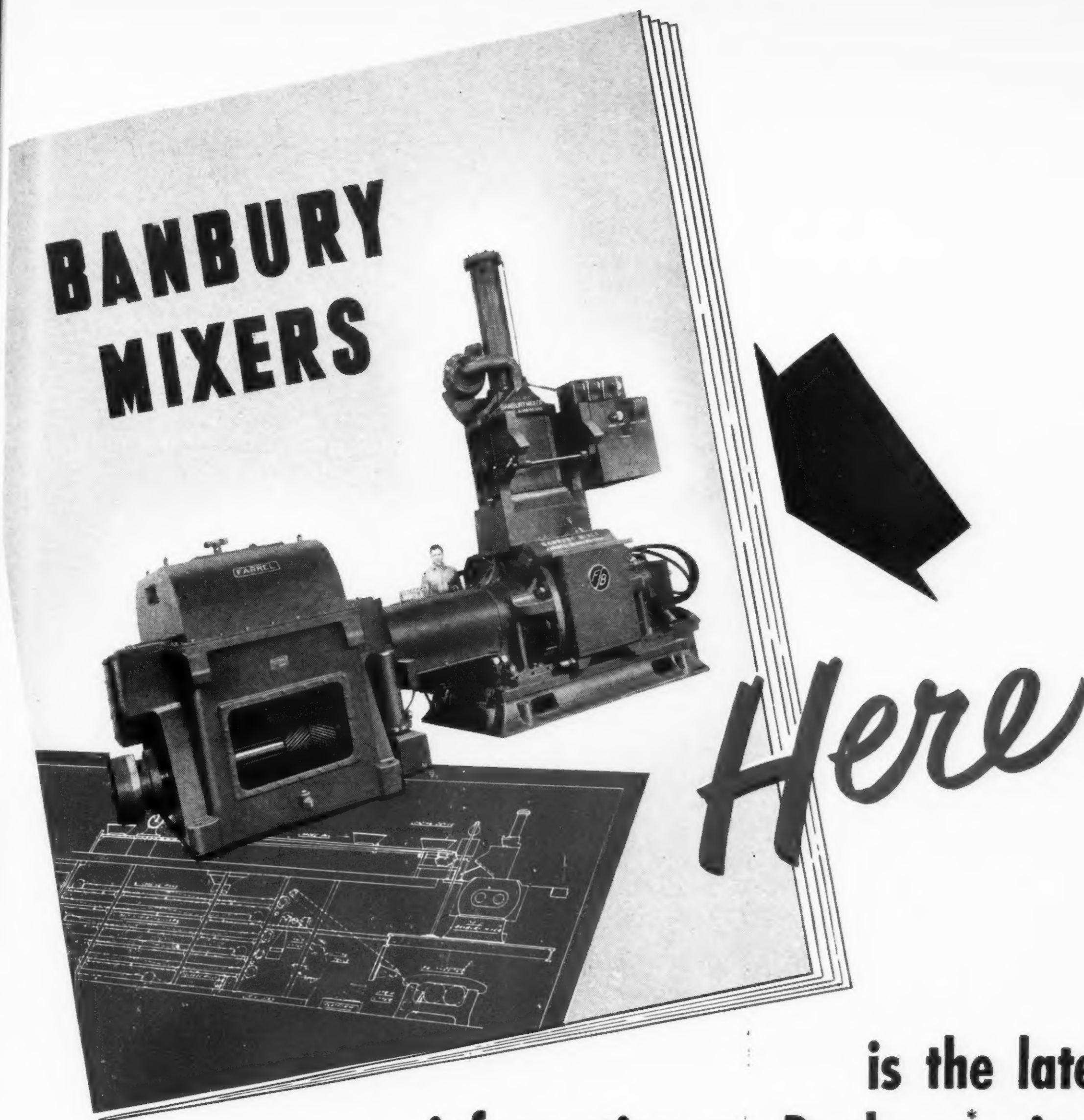
CARY CHEMICALS INC.

SUCCESSORS TO

BURGESS CHEMICAL CO.

Executive Sales Offices: 64 Hamilton St., Paterson 1, N. J.
Laboratory & Plant: Ryders Lane, Milltown, N. J.

CARY CHEMICALS PRODUCTS:
- Vinyl Compounds
- Vinyl Plasticizers
- Vinyl Resin
- Reclaiming Oils
- Sun-Proofing Waxes
- Esters
- Stearine Pitches



is the latest information on Banbury* mixers

For your free copy on the complete story of the latest Banbury developments, fill out the coupon below and drop it in the mail today.

FARREL-BIRMINGHAM COMPANY, INC. IRW
ANSONIA, CONNECTICUT

Please send me, without cost or obligation, a copy of your new Bulletin No. 198, "BANBURY MIXERS".

Name..

Company...

Address...

City...State..............

This new, 32-page, illustrated bulletin gives data on recent design advancements in Banbury mixers, including the heavy-duty, "Uni-drive" machine which has been developed for high-pressure, short-cycle mixing.

Photographs of the different sizes and types of Banburys, and various applications with pertinent drawings are included, as well as information and illustrations covering related equipment such as, mills, calenders, extruders, etc.

A revised table listing the sizes and capacities of the complete line of Banbury mixers has also been included.

FARREL-BIRMINGHAM COMPANY, INC., ANSONIA, CONN.

Plants: Ansonia and Derby, Conn., Buffalo, N. Y.
Sales Offices: Ansonia, Buffalo, New York, Akron, Chicago, Los Angeles, Houston

Farrel-Birmingham®

*Trade Mark

FB-885

ORONITE
CHEMICAL
COMPANY

Original and major source of supply!

POLYBUTENES

An important raw material in a variety of mechanical rubber products

Since 1935, when Oronite Polybutene was first produced and sold, these important raw materials have become widely used in a variety of rubber products. Their light color makes them specially acceptable for compounding light-colored molded rubber goods.

PROPERTIES: Oronite Polybutenes are clear, light in color, tacky, chemically inert liquids. They will not become gummy or waxy, do not harden, darken or change in any essential property over long periods of atmospheric exposure. Oronite Polybutenes can readily be emulsified using standard techniques and equipment. In the emulsified form or in their natural form, they are useful as tackifiers, plasticizers or extenders for natural or synthetic rubber products. Available in a number of high viscosity ranges to meet your requirements. Write or call any Oronite office for Polybutenes technical bulletin.

ORONITE CHEMICAL COMPANY

38 Sansome St., San Francisco 4, Calif. • Standard Oil Bldg., Los Angeles 15, Calif.
30 Rockefeller Plaza, New York 20, N. Y. • 600 S. Michigan Ave., Chicago 5, Ill.
Mercantile Securities Building, Dallas 1, Texas

2904

HI-SIL . . . for basketballs that can take it

Basketballs take a lot of punishment. They are banged, bounced, dribbled, slammed, spun, and whipped. The abrasion in a single game between the ball and the floor, and the ball and the bankboard, is extreme.

That's why basketball covers have to be rugged. To help make them that way, the MacGregor Company, leading sports equipment manufacturer, developed a scientifically designed rubber cover marketed under their tradename "Plylon." It is one of the toughest and most tear-and-scuff-resistant covers known; it is moisture-proof and feels almost like leather.

Hi-Sil®, the white reinforcing pigment developed by Columbia-Southern®, is the secret of this new rubber compound's exceptional resistance to abrasion and tear. The particles of Hi-Sil are extremely fine—it would require over 2 billion to cover a pinhead—and they are uniformly dispersed in the compound.

Hi-Sil is one of numerous chemical specialties produced by Columbia-Southern that augments its basic production of chlorine, caustic soda, soda ash and other alkalies.

The Columbia-Southern Pigment Family

Hi-Sil, together with Silene® and Calcene,® comprise Columbia-Southern's family of non-black reinforcing pigments.

These pigments are used in a multitude of white and colored rubber products for tensile strength as well as for increasing tear and abrasion resistance. A few of these applications include rubber soles and heels, wringer rolls, cable insulation, garden hose, white sidewall tires, and various molded goods.

For further information on any of the three Columbia-Southern pigments, or for experimental working samples, write today.

COLUMBIA-SOUTHERN
CHEMICAL CORPORATION

SUBSIDIARY OF PITTSBURGH PLATE GLASS COMPANY
ONE GATEWAY CENTER, PITTSBURGH 22, PENNSYLVANIA

DISTRICT OFFICES: BOSTON • CHARLOTTE
CHICAGO • CINCINNATI • CLEVELAND
DALLAS • HOUSTON • MINNEAPOLIS
NEW ORLEANS • NEW YORK • PHILADELPHIA
PITTSBURGH • ST. LOUIS • SAN FRANCISCO

For Rubber Compounding Use VELSICOL RESINS

NOW AVAILABLE IN VARYING MELTING-POINT RANGES AND COLORED GRADES

SOME SUGGESTED APPLICATIONS:

Mechanical Goods
Electrical Insulation Compounds
Rubber Shoe Soles and Heels
Rubber Floor Tiling
Gaskets and Jar Rings
Rubber Adhesives and Cements
Molded Rubber Products
Tubular Compounds
Reclaimed Rubber Sheeting
Colored Rubber Stocks
Battery Cases
Hard Rubber Compounds

FEATURES:

1 THERMOPLASTIC HYDROCARBON RESINS.
2 COMPATIBLE WITH NATURAL AND SYNTHETIC RUBBERS.
3 EFFECTIVE PLASTICIZERS AND SOFTENERS . . . in highly-loaded clay stocks or in recipes incorporating carbon black.
4 MILL READILY.
5 EXCELLENT DISPERSING AGENTS FOR FILLERS AND PIGMENTS.
6 FACILITATE PROCESSING PROCEDURES . . . impart excellent milling, calendering processing and tubing characteristics to stocks.
7 IMPART EXCELLENT PERFORMANCE CHARACTERISTICS . . . such as good tensile strength, elongation and modulus, as well as good resistance to abrasion and aging.
8 POSSESS HIGH ELECTRICAL RESISTANCE PROPERTIES.
9 AID IN THE DEVELOPMENT OF NON-SCORCHY STOCKS . . . without excessive retardation of cure at high temperatures.

For additional information concerning properties and applications of Velsicol Resins,
WRITE:

VELSICOL CORPORATION
General Offices and Laboratories
330 East Grand Avenue, Chicago 11, Illinois
Export Division
100 East 42nd Street, New York 17, New York
REPRESENTATIVES IN PRINCIPAL CITIES

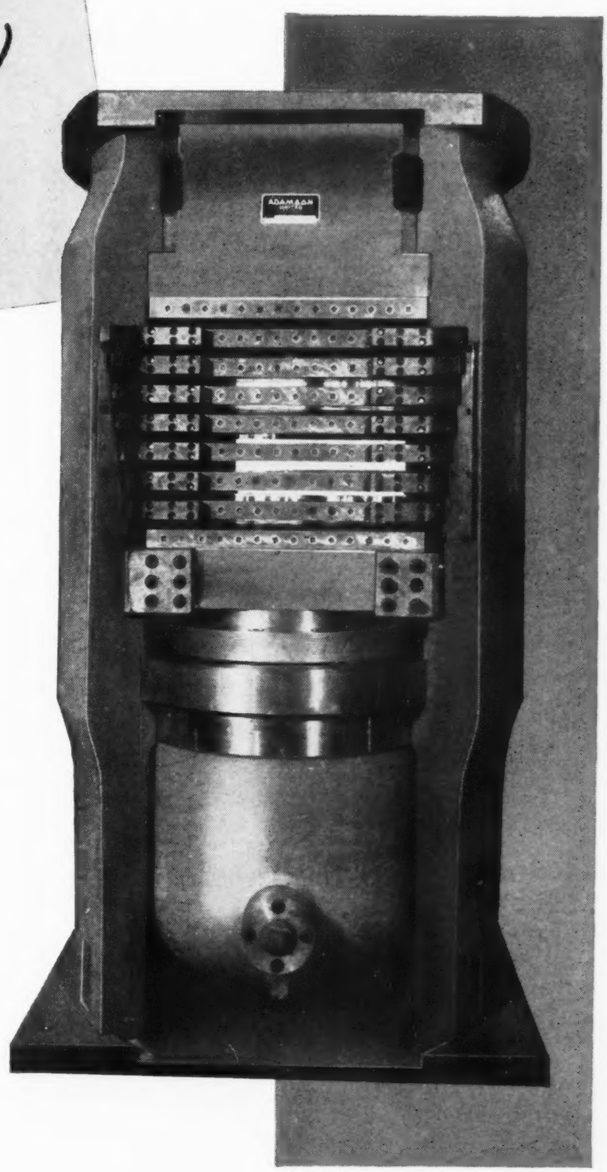
PETROLEUM DERIVED CHEMICALS
VELSICOL
SERVING BASIC INDUSTRIES

INCREASE PLATEN PRESSURE

45% to 76%

With no change in your present hydraulic lines

...With the NEW
ADAMSON UNITED BARREL PRESS



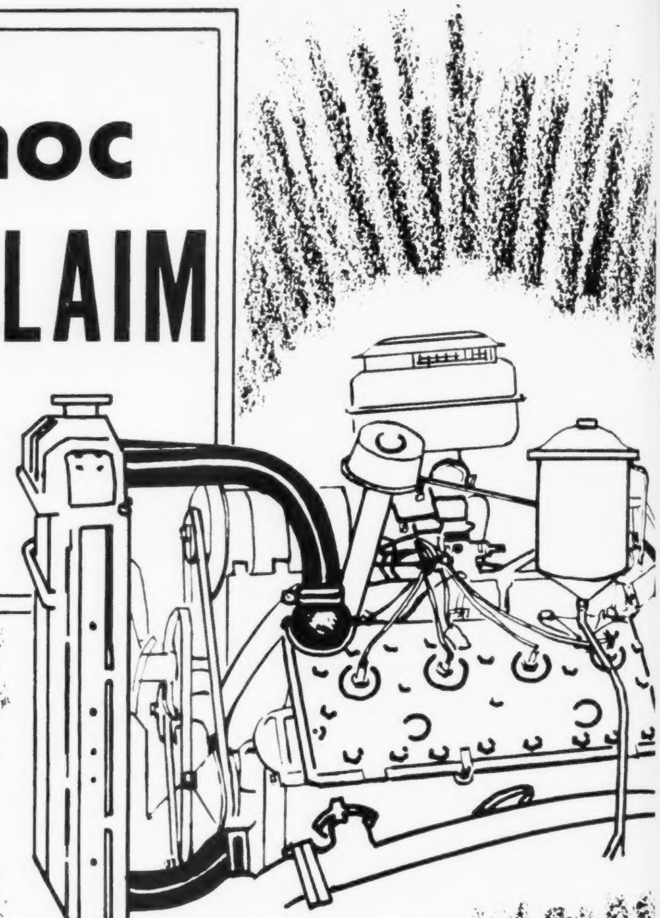
The new Adamson circular-side-plate, or Barrel Press is designed for high pressure molding of synthetic rubber and rubber plastic products. It provides pressures as high as 1800 pounds per sq. in., or approximately that required for light metal forming, with no change in the hydraulic lines that are now operating conventional, low pressure, rod-type presses.

The new Adamson Barrel Press meets the need for close tolerance, high pressure press work, with a minimum of deflection and resultant "flash" in the manufacture of items such as motor mounts, gas masks, crash helmets, carburetor diaphragms and other molded products. Present sizes range from 12″ through 32″, with larger sizes available to specification.

We believe you will be interested in the economies the Adamson Barrel Press can effect in your operation from the standpoint of both scrap reduction and accelerated product output. Your request for further information will not obligate you. Why not write today?

ADAMSON UNITED COMPANY
AKRON 4, OHIO
BRANCH OFFICES IN PRINCIPAL CITIES
Subsidiary of United Engineering and Foundry Company

Pequanoc BUTYL RECLAIM #5950



- Fast Mixing
- Smooth Extruding
- Tight Cure

FOR BUTYL RADIATOR HOSE

PEQUANOC 5950 BUTYL RECLAIM	64.7
FEF BLACK	15.5
HARD CLAY	9.7
ZINC OXIDE	1.9
STEARIC ACID	.8
PETROLATUM	2.7
PARAFFIN	2.7
SULFUR	1.2
TETRAMETHYL THIURAM DISULFIDE	.4
SANTOCURE	.4
	100.0

Press Cure 20 Min.	@ 320°F
Tensile	925
Elong.	425%
Duro "A"	75
Est. Lb. Cost	$.110
Sp. Gr.	1.34
Vol. Cost	.1474

Pequanoc Rubber Co.

MANUFACTURERS OF RECLAIMED RUBBER

MAIN SALES OFFICE and FACTORY: BUTLER, N. J.

Cabot "Cabflex" Plasticizers

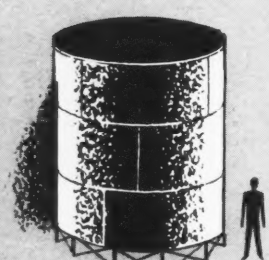
DELIVERED RAPIDLY, EFFICIENTLY

- Cabflex Di-OP *di-iso-octyl phthalate*
- Cabflex DOCP *di-iso-octyl capryl phthalate*
- Cabflex Di-OA *di-iso-octyl adipate*
- Cabflex DDP *di-decyl phthalate*
- Cabflex DDA *di-decyl adipate*
- Cabflex Di-BA *di-iso-butyl adipate*
- Cabflex Di-OZ *di-iso-octyl azelate*
- Cabol 100 *hydrocarbon oil plasticizer*

** Tank truck deliveries made from Cambridge to you take less time, are rapid and efficient . . .*

Plasticizer Division **GODFREY L. CABOT, INC.** CABOT

77 FRANKLIN STREET, BOSTON 10, MASS.



This is our source

From the cottonseed, A. Gross & Company produces for you Distilled Cottonseed Fatty Acids used in the manufacture of soaps, polishes, insecticides, lubricating greases, alkyd resins, adhesives, buffing compounds, grease sticks, and for the compounding of rubber.

. . . let A. Gross be yours

If you are looking for HIGH FATTY ACID CONTENT at low price, or a double distilled grade where the essential requirement is light coloration, A. Gross & Company should be your source of supply for Cottonseed Fatty Acids.

Send for samples and our catalog "Fatty Acids in Modern Industry."

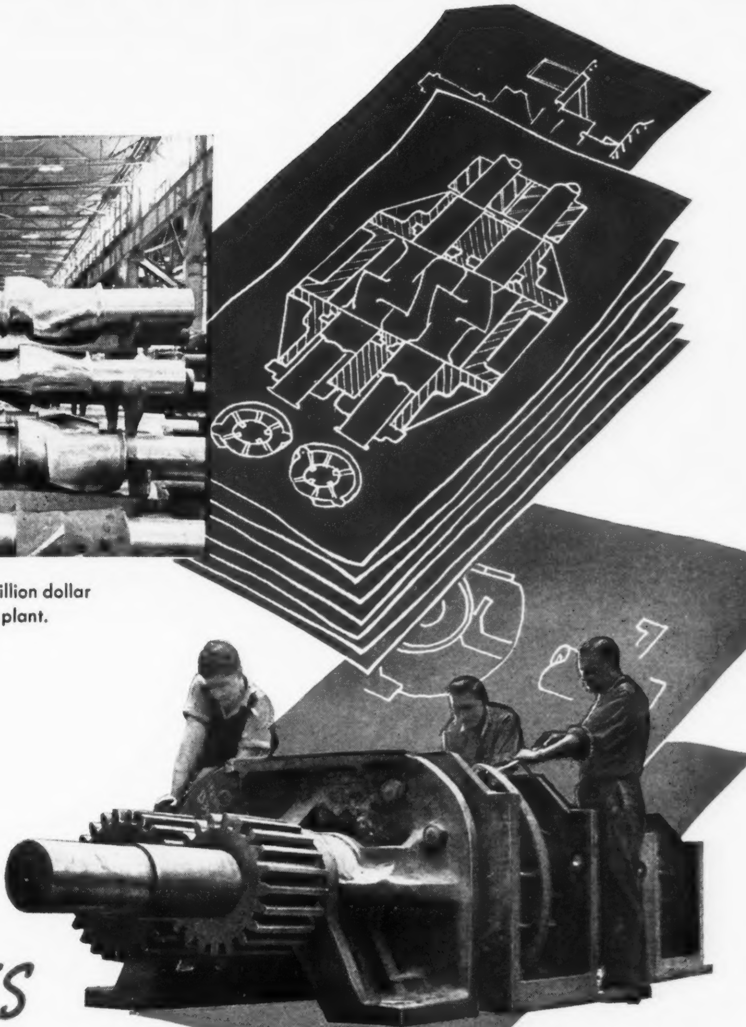
	GROCO 30 — DISTILLED	GROCO 35 — DOUBLE DISTILLED
Titre	36°— 39° C.	33°— 36° C.
Lovibond 5¼" Red	1.0 — 2.0	5 — 10
Lovibond 5¼" Yellow	5 — 15	30 — 50
Color Gardner 1933	1 — 3	
Unsaponifiable	1.5% max.	.0% max.
Saponification Value	201 — 206	200 — 204
Acid Value	200 — 205	199 — 203
Iodine Value (WIJS)	90 — 100	95 — 110

A. GROSS & COMPANY

295 Madison Ave., New York 17, N. Y. Factory, Newark, N. J.

Distributors in Principal Cities Manufacturers Since 1837

Part of Farrel-Birmingham's million dollar stock at the company's Derby plant.



THE BLUEPRINTS

used in building your Banbury* mixer are indispensable to thorough repairs

Farrel-Birmingham is the only company having complete blueprints giving required engineering information about all of the 775 parts which comprise a Banbury mixer. It is from these blueprints that your Banbury was originally made, and it is these same blueprints which figure so vitally in the thorough rebuilding of your machine.

For example, when a part—such as a rotor, a door top, or the inside of the chamber body—is worn, these blueprints show us just how much rebuilding is required to return the part to its original dimensions. There is no guessing.

37 years as the sole manufacturer of the Banbury has given Farrel-Birmingham the unequalled experience, facilities, and *know-how* to return a worn Banbury to its original work capacity. Furthermore, modern features of design and improved material, which provide higher operating efficiency and greater wearing qualities, can now be incorporated into a rebuilt machine.

You can be assured of quick service on your Banbury repairs because we carry by far the largest existing stock of standard parts and complete new bodies.

FARREL-BIRMINGHAM COMPANY, INC.

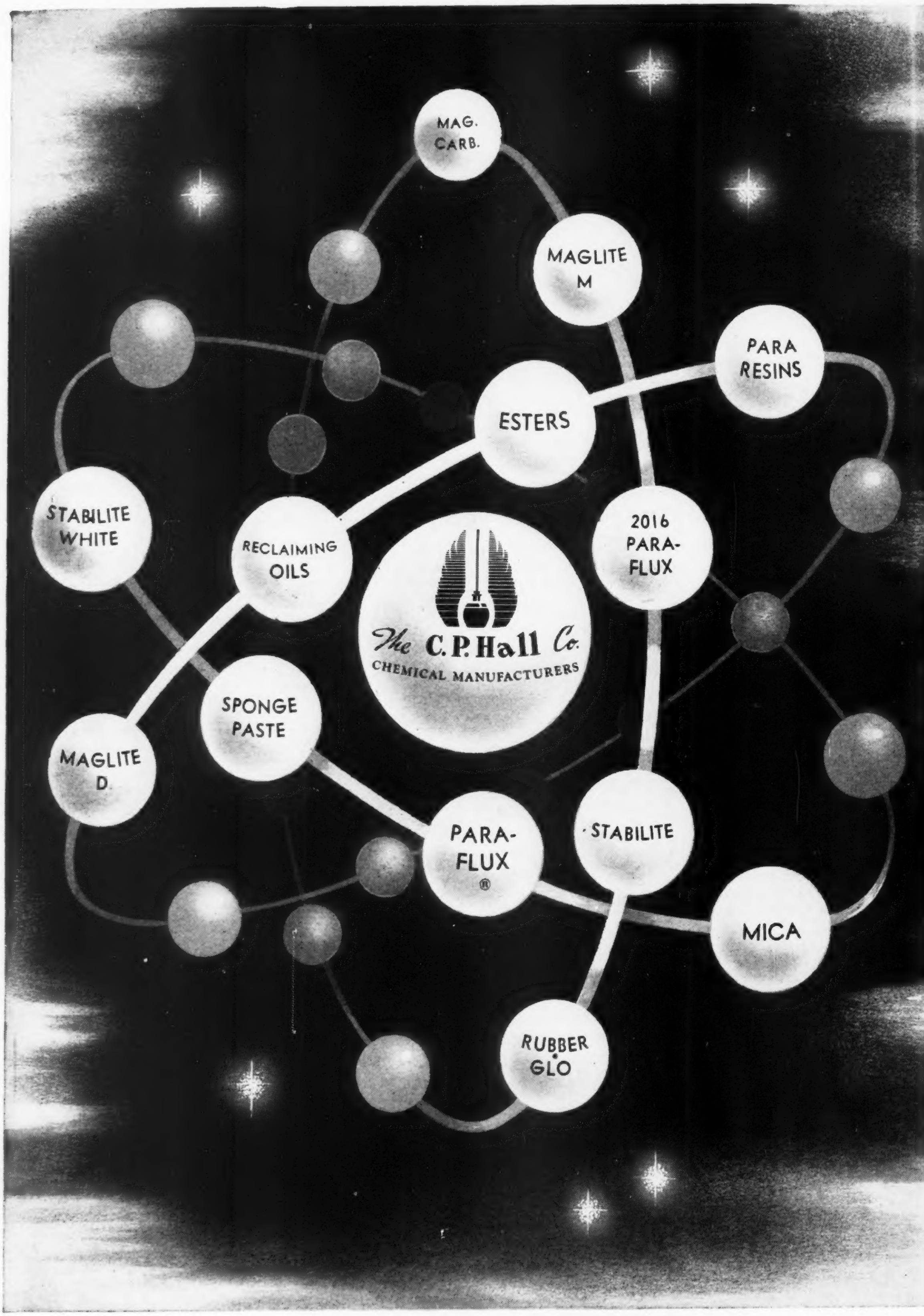
ANSONIA, CONN., (Telephone Ansonia 4-3331)

AKRON, OHIO, 2710 First National Tower (Tel. Jefferson 3149)
CHICAGO, ILLINOIS, 120 So. LaSalle St. (Tel. Andover 3-6434)
LOS ANGELES, CALIF., 2032 Santa Fe Ave. (Tel. Lafayette 3017)
HOUSTON, TEXAS, 860A M & M Building (Tel. Preston 4472)

*Trade-mark

Farrel-Birmingham®

FB-877

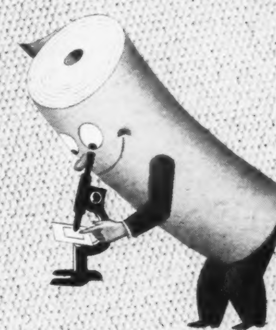


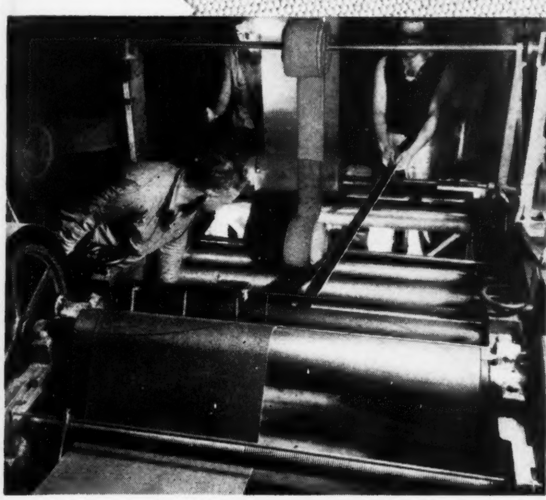
AKRON, OHIO ● LOS ANGELES, CALIF. ● CHICAGO, ILL. ● NEWARK, N. J.

UNIFORMITY
Makes The Big Difference In INDUSTRIAL FABRICS

MT. VERNON FABRICS

Give You Greater Fabric Uniformity





Checking evenness of roving with Belger Tester.

One of a series of comprehensive laboratory controls throughout production to assure uniformity in all Mt. Vernon-Woodberry products.

Mt. Vernon-Woodberry Mills

Branch Offices: Chicago • Atlanta
Baltimore • Boston • Los Angeles

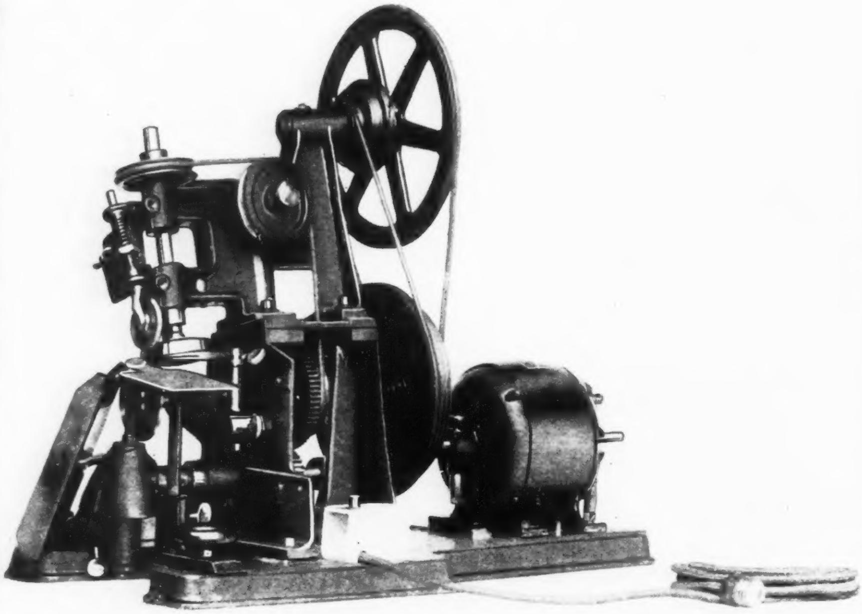
TURNER HALSEY
COMPANY
Selling Agents
40 WORTH ST. NEW YORK

FABRICS ENGINEERED TO FIT YOUR NEEDS

Need adaptation of an existing fabric to your special purposes? Or creation of an entirely NEW fabric — cotton, synthetic or blend — to meet your specifications? Mt. Vernon-Woodberry's staff of textile engineers is available on request to help you with your problems in development or application of industrial fabrics.

TW
MORRIS TRIMMING MACHINES

The World's Trimmer



SEMI-AUTOMATIC HEEL AND SOLE TRIMMER #20

Mail Address
6301 WINTHROP AVE.
CHICAGO 40, ILL.
CABLE "MORTRIM"

MOLDS

any capacity to
60 inches by 30 feet long

ACE MACHINE AND MOULD COMPANY, INC.

17 COLUMBUS AVENUE GARFIELD, N. J.

Designers and manufacturers of molds for rubber goods since 1925

We specialize in straight and varying cross-section molds for production of sponge rubber weatherstripping for aircraft and automotive industries.

Molds for use in McNeil and Glader presses.

We also manufacture molds for V-belts, belting, rails, etc.

TIME-TESTED

VERSATILE

SHARPLES ACCELERATOR

52

TETRAMETHYL-THIURAM DISULFIDE

Natural Rubber

Nitrile Rubber

GR-S

For HEAT RESISTANCE—SUPER AGING—TARNISH RESISTANCE
Use 3.0-4.0 PHR of **SA 52** as the VULCANIZING AGENT.

For FAST, TIGHT CURE
Use 0.4-1.5 PHR of **SA 52** as PRIMARY ACCELERATOR with 1.0-2.5 PHR of sulfur.

To ACTIVATE THIAZOLES
Use 0.05-0.30 PHR of **SA 52** as a SECONDARY ACCELERATOR.

Butyl Rubber

For STANDARD ACCELERATION
Use 1.0-3.0 PHR of **SA 52** with 0.5-2.0 PHR of sulfur.

For HEAT RESISTANCE—TARNISH RESISTANCE
Use 3.0-4.0 PHR of **SA 52** as the VULCANIZING AGENT.

Neoprene GN

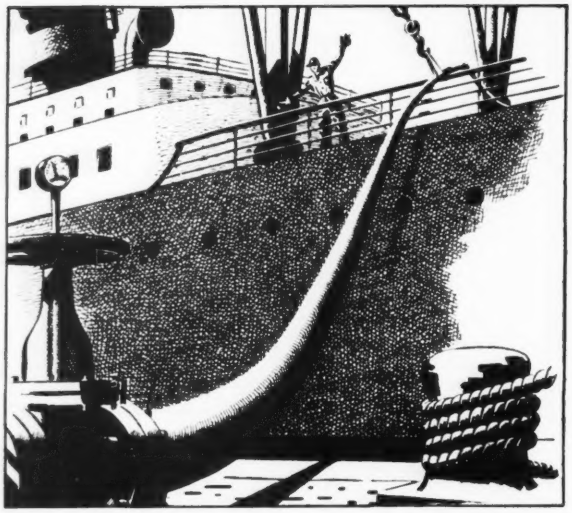
To INCREASE SCORCH TIME
Use 1.0-2.0 of **SA 52**.

SHARPLES TRADE MARK CHEMICALS

SHARPLES CHEMICALS INC.

A SUBSIDIARY OF THE PENNSYLVANIA SALT MANUFACTURING COMPANY

500 Fifth Ave., New York • 80 E. Jackson Blvd., Chicago • 106 S. Main St., Akron
West Coast: Los Angeles • Berkeley • Portland • Tacoma
Shawinigan Chemicals, Ltd., Montreal • Toronto
Airco Company International, New York



"Shawmut" hose duck is a soft, strong, plied-yarn fabric affording flexibility and good impregnation in a variety of hose applications.

"Columbus" sheeting is ideally suited for service rainwear and other rubberized products because of its constantly uniform quality.

YOU GET PERFORMANCE-PLUS WITH WELLINGTON SEARS "FIBER-ENGINEERED" FABRICS

In developing high-performance belt fabrics for the rubber industry, Wellington Sears engineers draw upon the special advantages of many textile fibers and fiber combinations.

In addition to "Shawmut" belting duck, long-known as a standard among cotton belt fabrics, Wellington Sears has developed fabrics "fiber-engineered" to meet special requirements—such as unusual strength combined with minimum weight and bulk. These fabrics give you performance-plus—service-plus—features because they utilize to the full the unique qualities of cotton, nylon, high-tenacity rayon and other fibers . . . singly or in combination.

You'll find other Wellington Sears fabrics for various mechanical rubber products, coating applications and specialties, listed below.

Write for your free copy of "Modern Textiles for Industry" which includes pertinent information on rubber applications. Address: Wellington Sears Co., Department K-5, 65 Worth Street, New York 13, New York.

Superior Fabrics for the Rubber Industry

- Belting duck
- Hose duck
- Enameling duck
- Army duck
- Single and plied-yarn chafers
- Sheeting
- Airplane cloth
- Balloon cloth
- Nylon, high tenacity rayon, other synthetics and combinations.

Wellington Sears

A SUBSIDIARY OF WEST POINT MANUFACTURING COMPANY

FIRST In Fabrics For Industry

WELLINGTON SEARS COMPANY, 65 WORTH STREET, NEW YORK 13, N. Y.

Offices In: Atlanta • Boston • Chicago • Detroit • Los Angeles • New Orleans • Philadelphia • San Francisco • St. Louis

IN THE
CENTRAL STATES
HARWICK STANDARD CHEMICAL CO., AKRON, OHIO
(GENERAL OFFICES)

Ready to serve you are technical sales representatives whose chemical and production experience may help you in compounding and procurement problems.

Harvey G. Greer, graduate chemist, has had many years experience in compound development and production in rubber and plastics. His background of technical know-how offers real assistance in helping customers with many production problems.

Albert Koper, graduate chemist with much experience in general rubber laboratory work, engineering and production. As technical sales representative his knowledge of chemicals and compounding can give customers competent assistance on many production problems.

John W. Shrontz, graduate chemist with practical experience in compound development and production. Technical sales representative who offers helpful assistance in problems on rubber and plastics compounding.

These men all serve the central states area out of our general offices in Akron, Ohio, located at 60 South Seiberling Street. Telephone: STadium 4-0481.

Harwick offers a complete line of materials, precision tested for the compounding of all types of rubbers and plastics:

SYNTHETIC RESINS —
- PICCOUMARON .... Para Coumarone Indenes
- PICCOLYTE .... Hydrocarbon Terpenes
- PICCOPALE .... Hard Hydrocarbon Resins
- PICCOLASTIC .... Styrene Resins
- RESINEX .... Aromatic resin type softener

PLASTICIZERS —
- POLYCIZER 162 .... Dioctyl Phthalate
- POLYCIZER 332 .... Dioctyl Adipate
- Dicapryl Phthalate
- Dibutyl Phthalate
- Tricresyl Phosphate

RUBBER SUBSTITUTES — Vulcanized Vegetable Oils

FILLERS —
- Clays and Whitings
- Silene EF — Reinforcing Pigment

MOLD AND STOCK LUBRICANTS.

MAGNESIUM PRODUCTS.

CASEIN.

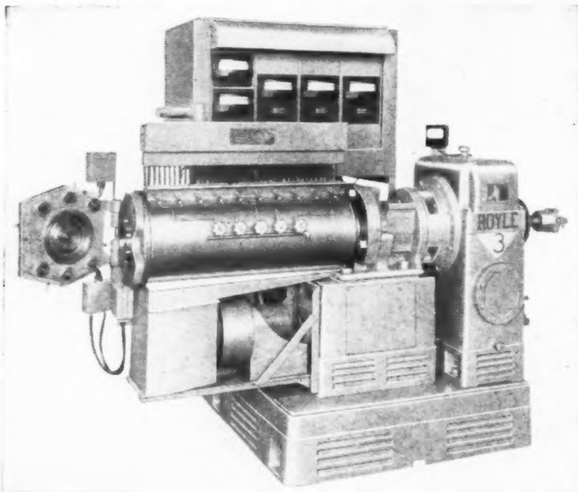
RUBBER-TO-METAL BONDING AGENTS .... THIXON

STABILIZERS —
- STABELAN .... E, HR Paste, Liquid and Powder

COLORS —
- STANTONE MBS Masterbatch)
- STANTONE GPE (Ground Polyethylene)
- STANTONE PC (Flushed)
- STANTONE Dry Colors (Pigment)
- STANTONE Rubber and Vinyl Inks.

HARWICK STANDARD CHEMICAL CO.
AKRON, BOSTON, TRENTON, CHICAGO, LOS ANGELES

FASTEST HEATING FASTEST COOLING



Here are some of the time-tested, money-saving reasons more and more plants are standardizing with Royle Spirod* Extruders for processes requiring maximum flexibility in controlled temperatures — constantly maintained and accurately zoned:

- **Extra heavy walled cast steel cylinders that will not warp. No joints to leak when pressures are high or crevices to collect burned compound that would cause contamination.**
- **Heavy duty large diameter heating elements, that can be used with 440 volts without step-down transformers, provide radiant heat to cylinders and heads.**
- **Any heating element may be removed and replaced without disturbing other elements or wiring.**
- **A cooling system with ten times the capacity of conventional designs can be modulated through its entire temperature range without drastic changes. Ample cooling for all compounds at maximum speeds.**

No. 3 Royle Spirod Extruder. Completely insulated and equipped for evaporative cooling.

*Patent Applied For

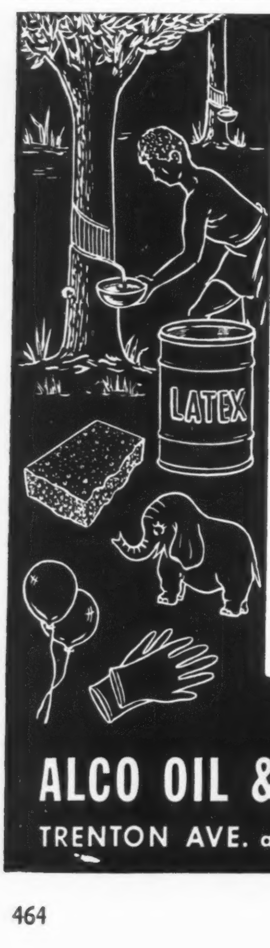
JOHN ROYLE & SONS

ROYLE PATERSON N. J.

PIONEERED THE CONTINUOUS EXTRUSION PROCESS IN 1880

London, England	Home Office	Akron, Ohio	Los Angeles, Cal.
James Day (Machinery) Ltd.	V. M. Hovey J. W. VanRiper	J. C. Clinefelter	H. M. Royal, Inc.
REgent 2430	SHerwood 2-8262	SWandale 4-5020	LOgan 3261

PATERSON 3, NEW JERSEY



VULCARITES

DISPERSIONS OF RUBBER CHEMICALS for NATURAL AND SYNTHETIC LATEX COMPOUNDING

"VULCARITE" denotes individual or composite ball-milled dispersions of zinc oxide, sulfur, antioxidants and accelerators.

"VULCARITE" also signifies the most exacting and rigid quality control according to your specifications.

Our sales and technical staffs are at your disposal.

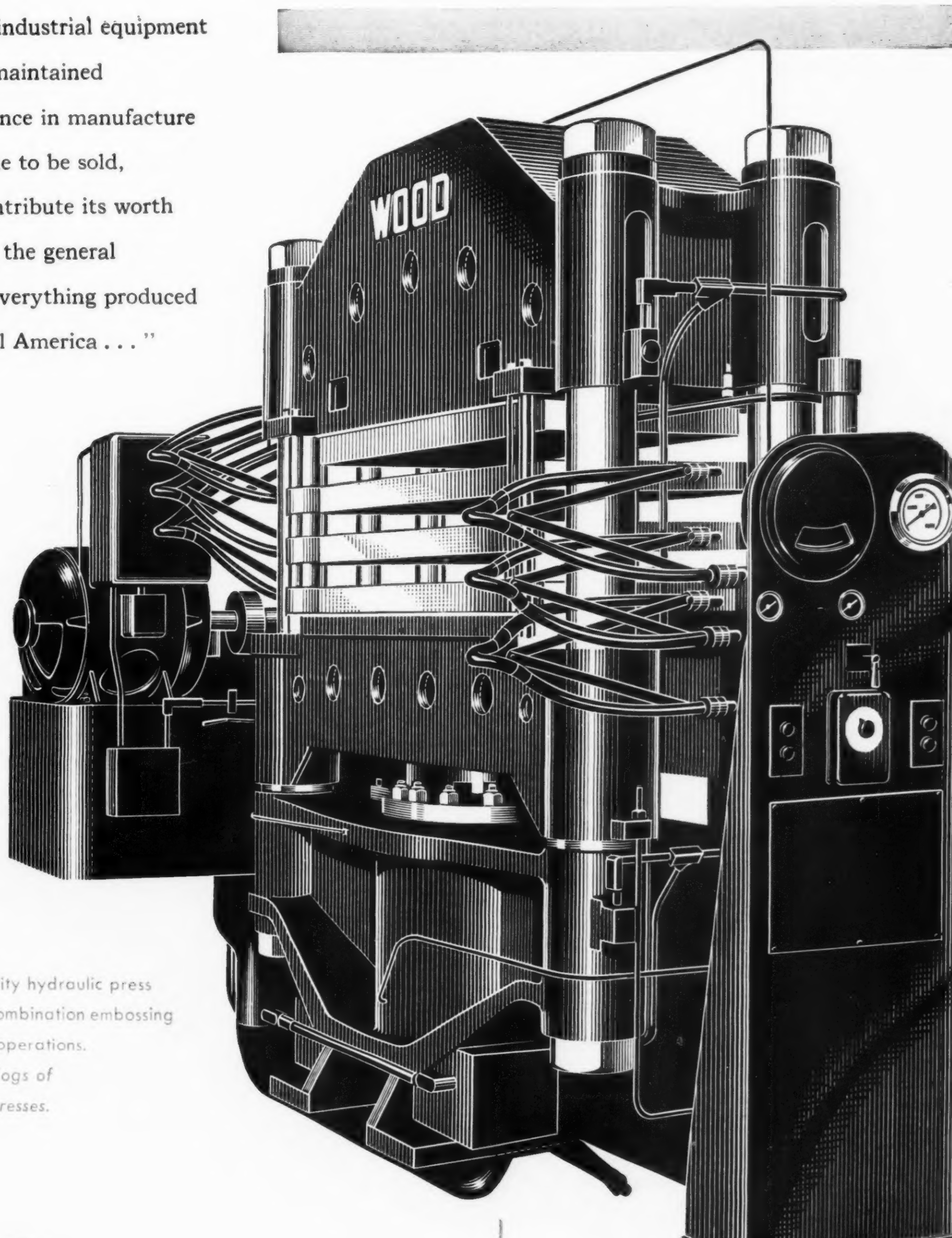
ALCO OIL & CHEMICAL CORPORATION

TRENTON AVE. and WILLIAM ST., PHILADELPHIA 34, PA.

NEW ENGLAND OFFICE
Alco Oil & Chemical Corp.
610 Industrial Trust Bldg.
111 Westminster St., Providence 3, R. I.
Phone: ELmhurst 1-4559

R. D. Wood Hydraulic Presses

"... that industrial equipment
which has maintained
high excellence in manufacture
will continue to be sold,
and will contribute its worth
to uplifting the general
quality of everything produced
in industrial America ..."



500-ton capacity hydraulic press designed for combination embossing and polishing operations. Write for catalogs of our hydraulic presses.

WOOD

R. D. WOOD COMPANY

PUBLIC LEDGER BUILDING, PHILADELPHIA 5, PA.

150 th anniversary

HYDRAULIC PRESSES AND VALVES FOR EVERY PURPOSE • ACCUMULATORS • ALLEVIATORS • INTENSIFIERS

THE SEAL OF DEPENDABILITY

Our products are engineered to fill every need in natural and synthetic rubber compounding wherever the use of vulcanized oil is indicated.

We point with pride not only to a complete line of solid Brown, White, "Neophax" and "Amberex" grades, but also to our hydrocarbon solutions of "Factice" for use in their appropriate compounds.

Continuing research and development in our laboratory and rigid production control has made us the leader in this field. The services of our laboratory are at your disposal in solving your compounding problems.

Oldest and Largest Manufacturers of "Factice" Brand Vulcanized Oil Since 1900

Reg. U.S. Pat. Off.

THE STAMFORD RUBBER SUPPLY COMPANY
Stamford, Conn.

Rubber

Natural - Synthetic

S. J. PIKE & CO., INC.

30 CHURCH STREET, NEW YORK 7, N. Y.

CABLE ADDRESS "PIKESID, N.Y." TWX-NY 1-3214 TEL: WOrth 4-1776

In Akron:
Tanney-Costello, Inc.
868 E. Tallmadge Ave.
Blackstone 4148

In Alhambra, Calif.:
Merit Western Co.
George Steinbach
717 So. Date Ave.
Cumberland 3-1400

GUILLOTINE cutter machines are used for cutting either cured or uncured rubber or like materials to specific lengths. Clicking machines are used to cut the same materials to shape by means of a clicker type die. "Powermax" cutters perform speedy automotive cutting to very close tolerances with either manual loading or directly coupled to calender, mill or tubing machines. Controlled conveyor belt movement insures an accurate cut each time. Both speed and length of cut can be adjusted while machine is in operation. Knife cutting machines are equipped with an overhead driven roll preventing slippage on the conveyor belt of rubber or other material being cut. This roll may be raised when not needed. Maximum thickness of cut is 3″ on the standard machine, maximum speed 90 cuts per minute and cutting lengths can be varied from 0″ to 30″.

Send for our new Bulletin "W" today. It contains basic facts and information describing the Guillotine cutter and many other types of Akron Standard Equipment.

akron standard mold company

AKRON 8, THE ESTABLISHED MEASURE OF VALUE **OHIO**

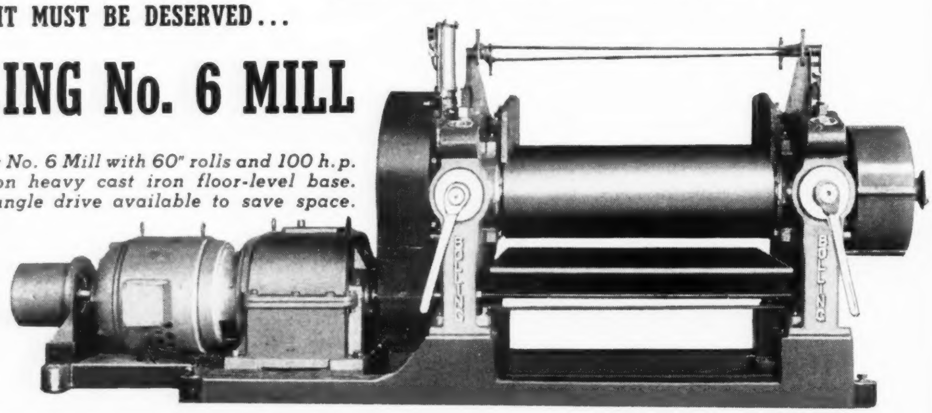
Such Popularity!—

IT MUST BE DESERVED...

the BOLLING No. 6 MILL

Deservedly popular, because suited to so many purposes: (1) for mixing—with 20" dia. by 50" face rolls; (2) for sheeting in conjunction with the Bolling Spiral-Flow Intensive Mixer—with 60" face rolls; (3) for extra heavy duty generally—with 42" face rolls.

The Bolling No. 6 Mill is just one of 10 sizes of efficient 2-roll mills—all modern in conception, standard in design, rugged, dependable, priced to speed production and increase profits.



Bolling No. 6 Mill with 60" rolls and 100 h.p. drive on heavy cast iron floor-level base. Right-angle drive available to save space.

Ask for Catalog "W-1"

STEWART BOLLING & COMPANY, INC.
3192 EAST 65TH STREET • CLEVELAND 27, OHIO

• INTENSIVE MIXERS AND MILLS • CALENDERS • REFINERS • CRACKERS HYDRAULIC PRESSES • PUMP UNITS BALE SLITTERS • SPEED REDUCERS

TANNEY·COSTELLO
INCORPORATED

NATURAL & SCRAP RUBBER
—
PLASTICS & SYNTHETICS

P. O. BOX 1112
868 E. TALLMADGE AVE., AKRON 9, OHIO

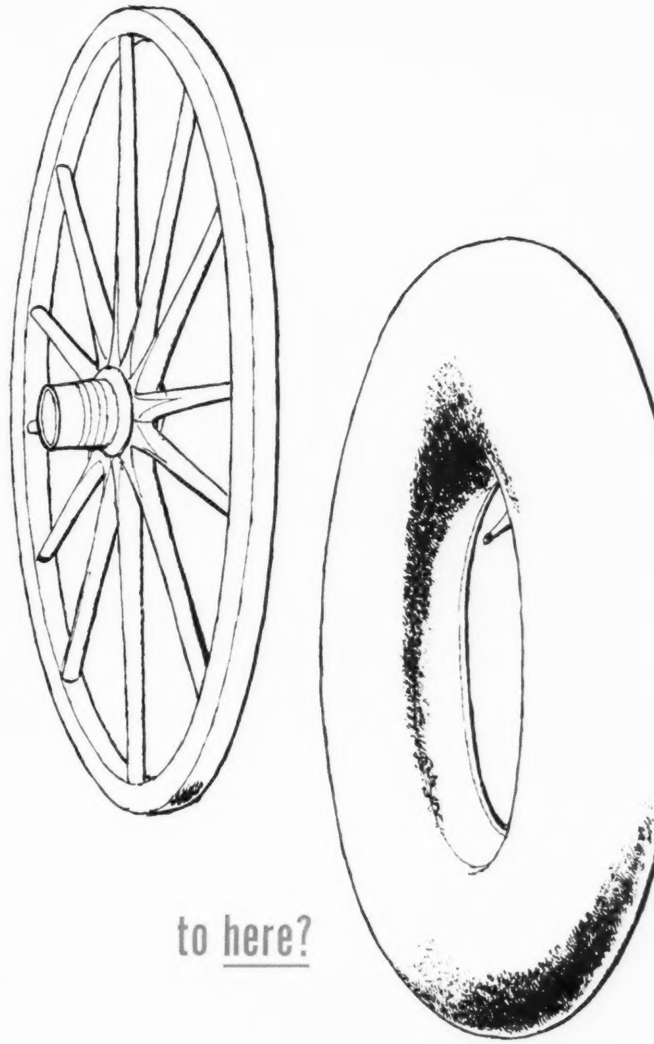
REPRESENTATIVES FOR:

S. J. PIKE & CO., INC.

Rubber — Natural and Synthetic
30 CHURCH STREET, NEW YORK 7, N. Y.

THE HISTORY OF THE RUBBER INDUSTRY—Number 7

how long did it take to get from here



to here?

Answer: Two years.

The principle of an inner tube is simple, and of such ancient application that it could not be patented.

Inner tubes, as we think of them today, were probably used about 1890. By 1892—two years later—they were being used widely, and beginning to appear as the detachable tube, for double tube tires, and the vulcanized-in type, used in single tube tires.

Two Monsanto accelerators, Thiofide (powder) and Thiofide S (seeds), can be used successfully in a wide variety of stocks. The seeds give maximum speed and completeness of dispersion. For more information about these accelerators and other products, see catalog "Monsanto Chemicals for the Rubber Industry." If you do not have a copy, write to MONSANTO CHEMICAL COMPANY, Rubber Service Department, 920 Brown Street, Akron 11, Ohio.

MONSANTO CHEMICALS FOR THE RUBBER INDUSTRY

ANTIOXIDANTS

Flectol* H
Santoflex* B
Santoflex BX
Santoflex 35
Santoflex AW
Santowhite* Crystals
Santowhite MK
Santowhite L

ALDEHYDE AMINE ACCELERATORS

A-32
A-100

MERCAPTO ACCELERATORS

Santocure*
El-Sixty*
Mertax (Purified Thiotax)
Thiotax (2-Mercapto benzothiazole)
Thiofide* (2,2' dithio-bis benzothiazole)

GUANIDINE ACCELERATORS

Diphenylguanidine (D.P.G.)
Guantal*

ULTRA ACCELERATORS FOR LATEX, ETC.

R-2 Crystals
RZ-50
RZ-50-B
Pip-Pip
Thiurad* (Tetramethylthiuram disulfide)
Ethyl Thiurad (Tetraethylthiuram disulfide)
Mono Thiurad (Tetramethylthiuram monosulfide)
Methasan* (Zinc salt of dimethyl dithiocarbamic acid)
Ethasan* (Zinc salt of diethyl dithiocarbamic acid)
Butasan* (Zinc salt of dibutyl dithiocarbamic acid)

SPECIAL MATERIALS

Thiocarbanilide ("A-1")
Santovar*-A
Santovar-O
Sulfasan R
Insoluble Sulfur "60"

COLORS

REODORANTS

*Reg. U. S. Pat. Off.

MONSANTO
CHEMICALS – PLASTICS

SERVING INDUSTRY...WHICH SERVES MANKIND

Cut rubber stock the way you want it cut
—with a specialized

TAYLOR-STILES RUBBER CUTTER

These cutters are of several distinct types, as developed by us for specific rubber manufacturing purposes.

Included are machines:

- **To cut extruded rubber strips** into uniform pieces either for molding, as in making rubber heels and soles or for convenient storing and mixing.
- **To cross cut rubber stock into uniform pellets** of any desired size in one machine, which slits the sheet of stock into strips then cross cuts the strips in one continuous precise operation, with a minimum of shorts and longs.
- **To cut and cross cut stock** with two machines set at an angle to one another.
- To cut scrap rubber in the manufacture of reclaimed rubber.

•

Let us tell you how Taylor-Stiles cutters will improve your rubber working process and save time and money for you.

TAYLOR-STILES and Company
CUTTING MACHINES & KNIVES

16 Bridge Street, Riegelsville, N. J.

VULCANIZED VEGETABLE OILS

—RUBBER SUBSTITUTES—

•

Types, grades and blends for every purpose, wherever Vulcanized Vegetable Oils can be used in production of Rubber Goods—be they Synthetic, Natural, or Reclaimed.

•

A LONG ESTABLISHED AND PROVEN PRODUCT

THE CARTER BELL MFG. CO.
SINCE
CARTER BELL PRODUCTS
1903
SPRINGFIELD, NEW JERSEY

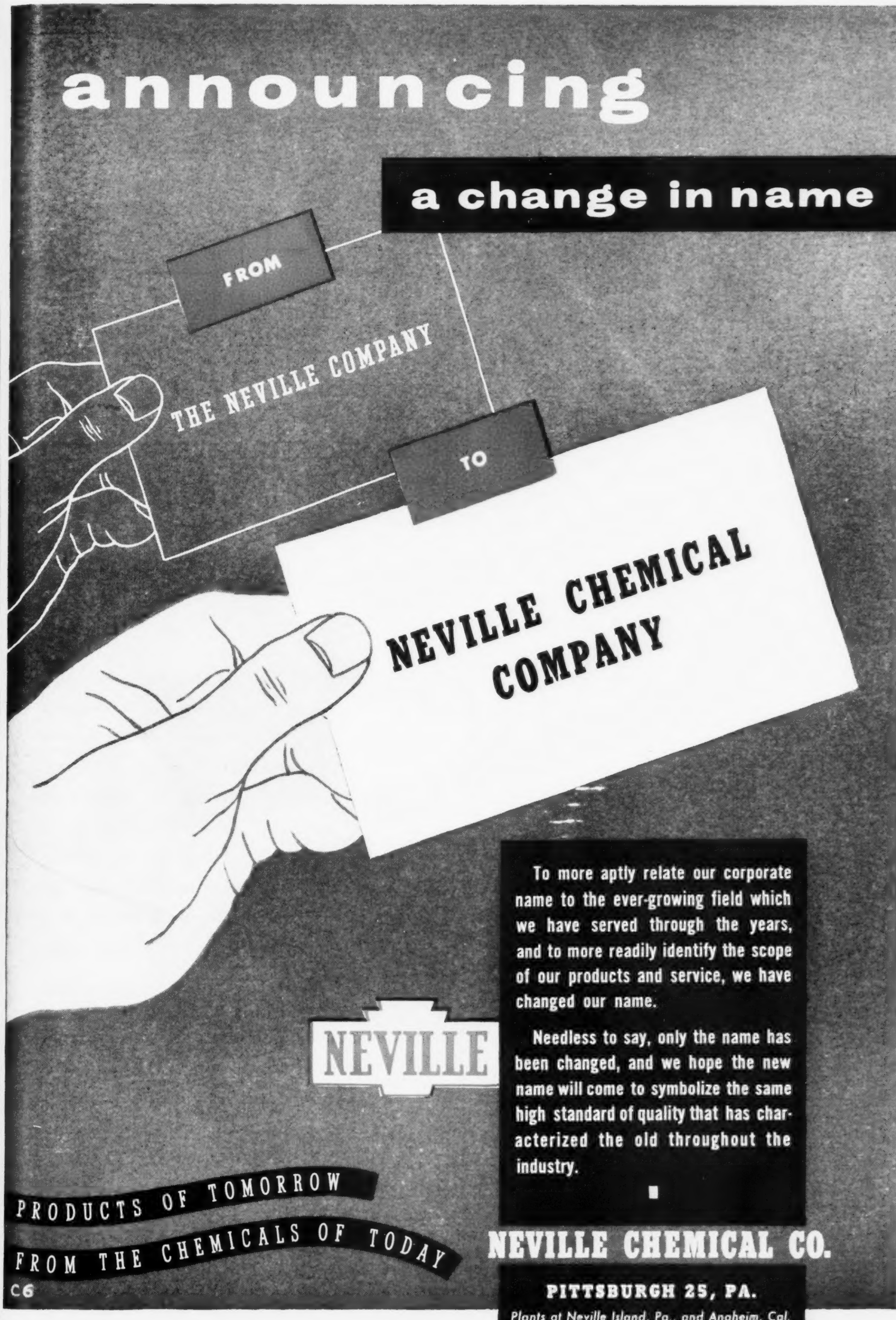
Represented by:
HARWICK STANDARD CHEMICAL CO.
Akron — Boston — Trenton — Chicago — Denver — Los Angeles

P

F

C

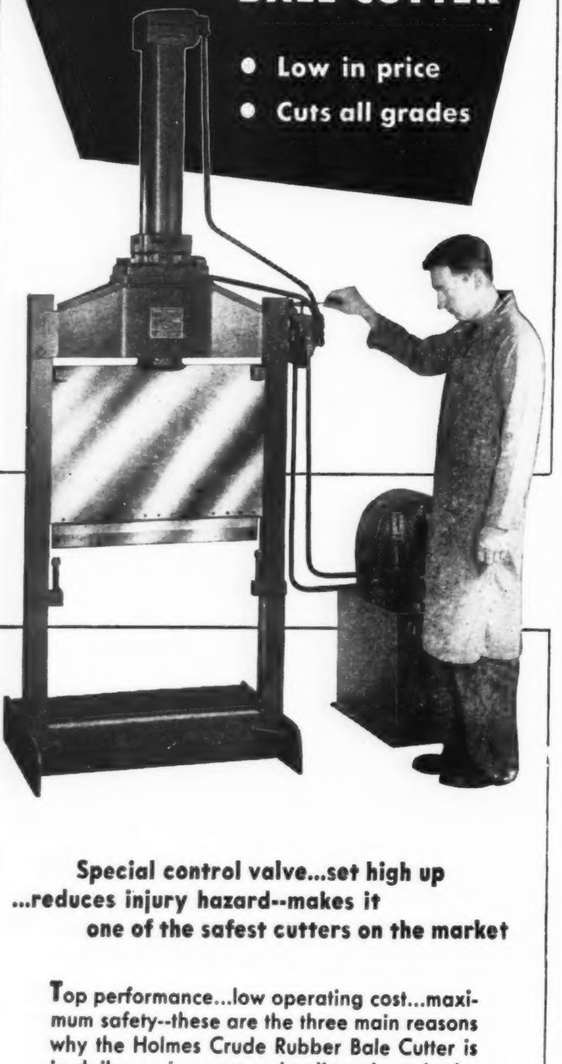
Janu


announcing
a change in name
FROM
THE NEVILLE COMPANY
TO
NEVILLE CHEMICAL COMPANY
To more aptly relate our corporate name to the ever-growing field which we have served through the years, and to more readily identify the scope of our products and service, we have changed our name.
Needless to say, only the name has been changed, and we hope the new name will come to symbolize the same high standard of quality that has characterized the old throughout the industry.
NEVILLE
PRODUCTS OF TOMORROW
FROM THE CHEMICALS OF TODAY
C6
NEVILLE CHEMICAL CO.
PITTSBURGH 25, PA.
Plants at Neville Island, Pa., and Anaheim, Cal.

You'll cut costs, too, with--

The HOLMES CRUDE RUBBER BALE CUTTER

- Low in price
- Cuts all grades



Special control valve...set high up ...reduces injury hazard--makes it one of the safest cutters on the market

Top performance...low operating cost...maximum safety--these are the three main reasons why the Holmes Crude Rubber Bale Cutter is in daily use in so many leading plants in the rubber industry.

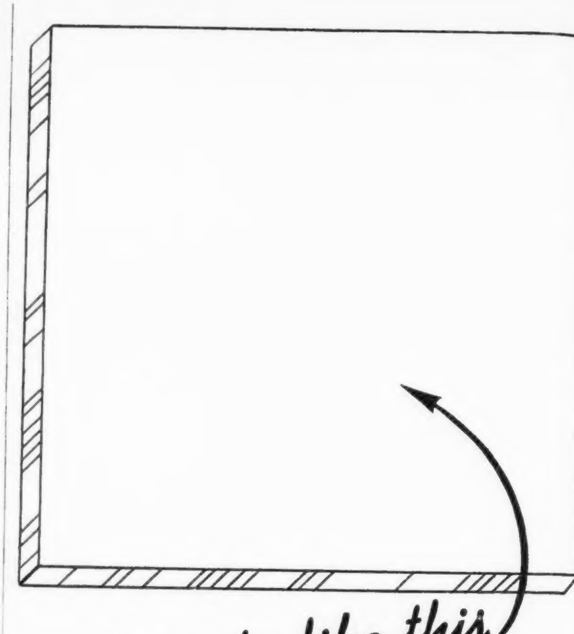
As illustrated, it is a complete, self-contained unit with pump, tank, and 5 H.P. motor. Knife--29 1/4" wide. Stroke--23". Height--8' 5". Floor Space--36" x 64". And--the initial cost is low.

WRITE OR WIRE FOR SPECIFIC DETAILS—regardless of your particular requirements. With 52 years know-how specializing in machinery and molds for the rubber industry--Holmes can help you solve your problems, too, as they have for so many others. No obligation, of course.

Stanley H. HOLMES Company

Successor to Holmes Bros., Inc.

440 N. Sacramento Blvd., Chicago 12, Ill.



for Clarity like this

Use Stabilizer MARK X *for your transparent Vinyls*

Stabilizer Mark X has been developed specifically to give extreme clarity to transparent vinyl. An organo-tin-sulphur compound of exceptional heat stability, stabilizer Mark X prevents haze, yellowing and darkening of the vinyl compounds.

Because stabilizer Mark X is a liquid, it mixes easily and quickly with the plasticizer. And, because of its high efficiency, only a small amount is required to provide never-before-possible clarity.

Mark X is the perfect stabilizer for countless rigid applications and many unsupported vinyl film uses. Discover all the advantages of Mark X by getting a working sample for tests with your own formulations. Write or phone today.

ARGUS CHEMICAL LABORATORY

633 Court Street, Brooklyn 31, N. Y.

REMEMBER THE "*Half-Sole*" TREAD?

. . . It was introduced in 1914 by GATES

In those early days of motoring, when tire mileage seldom exceeded 5,000 miles, Gates' new International "Half-Sole" Treads quickly won the acclaim of motorists by enabling them to increase this standard significantly. Many of today's rubber industry people — and many motorists too — will remember the unique "I H" design of the Gates "Half-Sole" Treads, and the picturesque slogan: "You Half-Sole Your Shoes . . . Why Not Your Tires?"

The Gates "Half-Sole" is well-remembered here at Bridgwater. Like *most* of the famous treads in rubber industry history, it came from molds of our own manufacture. But long *before* the "Half-Sole", Bridgwater's mold-making technology was advancing the standards of tire mold quality. Since 1906, in fact, we have worked closely with the rubber industry, *helping* it advance the standards of tire performance by furnishing custom-built molds for more efficient, more economical production of quality automotive tires.

Typical of the advanced nature of the mold-making service Bridgwater makes available to the tire industry today, are the modern, *complete* facilities of our Athens Machine Division, the only plant in the world devoted *exclusively* to tire mold manufacture.

Here, automotive tire molds of any size or type — in steel, cast iron or aluminum — are precision-built by long-experienced Bridgwater technicians and craftsmen. And their sole job is to produce higher quality molds for the tire industry — at exceptionally favorable costs.

ATHENS MACHINE DIVISION

THE BRIDGWATER MACHINE COMPANY

Akron, Ohio

1785

ORIGINAL PRODUCERS OF MAGNESIUM SALTS FROM SEA WATER

Magnesium salts from the sea

REGULAR AND SPECIAL GRADES OF
MAGNESIUM
CARBONATES
OXIDES
FOR THE RUBBER INDUSTRY

MARINE MAGNESIUM PRODUCTS DIVISION OF MERCK & CO., INC.

Main Office, Plant and Laboratories
SOUTH SAN FRANCISCO, CALIFORNIA
Distributors:

WHITTAKER, CLARK & DANIELS, INC.
260 West Broadway, New York
CHICAGO: Harry Holland & Son, Inc.
PHILADELPHIA: R. Peltz Co.
TORONTO: Richardson Agencies, Ltd.

PALMER SUPPLIES CO.
Cincinnati, Cleveland

G. S. ROBINS & CO.
126 Chouteau Ave., St. Louis

THE C. P. HALL CO., Akron, Chicago, Los Angeles, Newark

Write for Brochure

The term
"COTTON FLOCKS"
does not mean cotton fiber alone

EXPERIENCE
over twenty years catering to rubber manufacturers

CAPACITY
for large production and quick deliverv

CONFIDENCE
of the entire rubber industry

KNOWLEDGE
of the industry's needs

QUALITY
acknowledged superior by all users are important and valuable considerations to the consumer.

Write to the country's leading makers for samples and prices.

CLAREMONT WASTE MFG. CO.

CLAREMONT **N. H.**

The Country's Leading Makers

QUALITY **INTEGRITY** **SERVICE**

73 YEARS WITHOUT REORGANIZATION

BELTING
Transmission—Conveyor—Elevator

HOSE
for every purpose
Water—Fire—Air—Steam

HOME RUBBER CO. TRENTON, N.J. STEAM NEVER BURN BLOW OUT PACKING CHICAGO NEW YORK

PACKING
Sheet & Rod Packings
for every condition

Mechanical Specialties of Every Description

HOME RUBBER COMPANY

Factory & Main Office
TRENTON 5, N. J.

LONDON: 107 Clifton St., Finsbury CHICAGO: 168 North Clinton St. NEW YORK: 80-82 Reade St.

Top-Quality that never varies!

THE GENERAL TIRE & RUBBER COMPANY
AKRON, OHIO

AZUSA, CALIFORNIA • BOWLING GREEN, OHIO • CUYAHOGA FALLS, OHIO
WACO AND BAYTOWN, TEXAS • JEANNETTE, PENNSYLVANIA
BARNESVILLE, GEORGIA • LOGANSPORT AND WABASH, INDIANA
FOREIGN OPERATIONS: RIO DE JANEIRO, BRAZIL • TORONTO, CANADA
TEL AVIV, ISRAEL • MEXICO CITY, MEXICO • MAIPU, CHILE
MADRID AND TORRELAVEGA, SPAIN • OPONTO AND LOUSADA, PORTUGAL
CARACAS, VENEZUELA • PORT ELIZABETH, SOUTH AFRICA

FOR THE PRECISION MOLDING OF RUBBER PRODUCTS

THIS Erie Foundry Company 800 Ton Precision Hydraulic Press is designed and built to close tolerances. A number of these special presses purchased by one of the nation's largest rubber processors, are required in precision molding of special rubber products. Your specifications for precision presses are in capable hands when you send them to Erie Foundry Company. A half century of engineering and craftsmanship is at your command. Write for bulletin 350.

ERIE FOUNDRY COMPANY HYDRAULIC PRESSES

ERIE FOUNDRY COMPANY • ERIE, PA., U.S.A.

DETROIT 335 Curtis Building • CHICAGO 13 South Austin Blvd. • INDIANAPOLIS 2302 N. Meridian Street • NEW ENGLAND G. V. Eads, Kent, Conn.

PERMANENT BONDING QUALITIES...
EXTENDED 'TACK LIFE'...

'TUF-GRIP' is tops for extra strong bonding.
'TUF-GRIP' is available with short or long periods of "tack life."
'TUF-GRIP' is available in clear or colors inlcuding black and white.
'TUF-GRIP' is thoroughly dependable and it's tough!

IT'S WIDELY ADAPTABLE...
Adheres well to cellulose... wood... rubber ...leather... cloth... cork and synthetic rubber surfaces.

'TUF-GRIP'
by HADLEY'S
a new, proved line of
SOLVENT TYPE CEMENTS
FOR MACHINE OR BRUSH APPLICATIONS

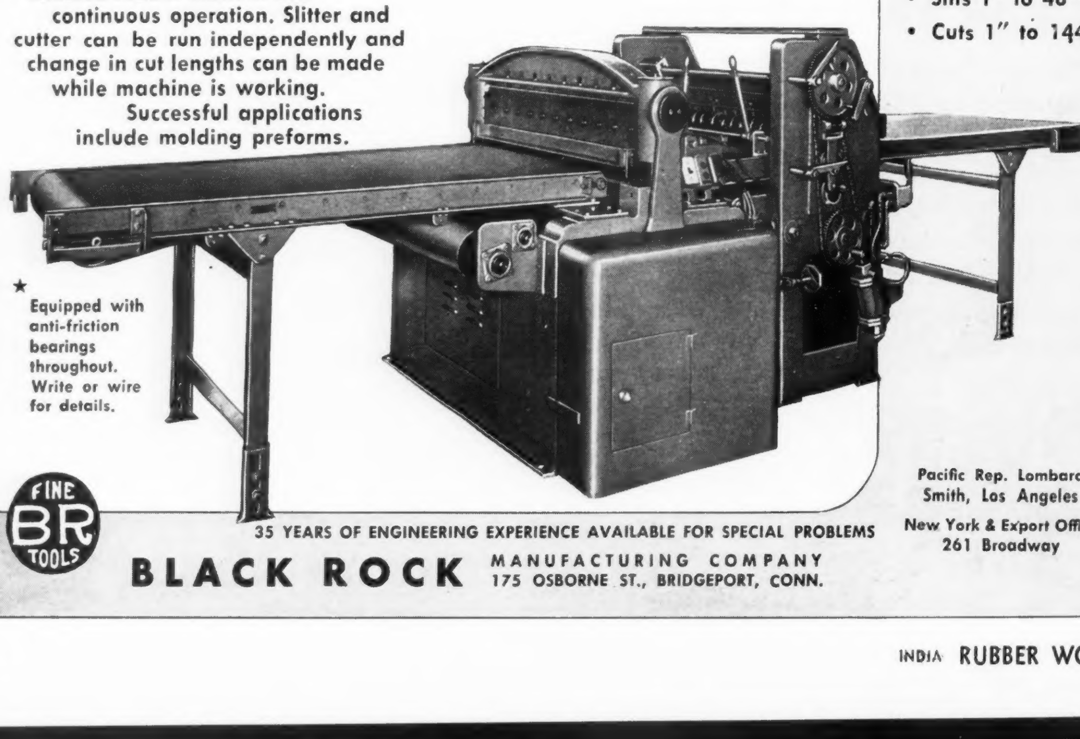
SINCE 1919
Send Us Your Adhesion Problems

HADLEY BROS.-UHL CO.
514 CALVARY AVE. • ST. LOUIS 15, MO.

TIME SAVER...MONEY SAVER
CUTTER *Combination* SLITTER
FOR FAST PRODUCTION!

- Save time
- Save labor
- Save space
- More accuracy
- Big capacity
- Slits 1" to 48"
- Cuts 1" to 144"

Now — cut and slit cured and uncured rubber stock in one continuous operation. Slitter and cutter can be run independently and change in cut lengths can be made while machine is working. Successful applications include molding preforms.



★ Equipped with anti-friction bearings throughout. Write or wire for details.

Pacific Rep. Lombard Smith, Los Angeles

New York & Export Office 261 Broadway

FINE BR TOOLS

35 YEARS OF ENGINEERING EXPERIENCE AVAILABLE FOR SPECIAL PROBLEMS

BLACK ROCK MANUFACTURING COMPANY
175 OSBORNE ST., BRIDGEPORT, CONN.

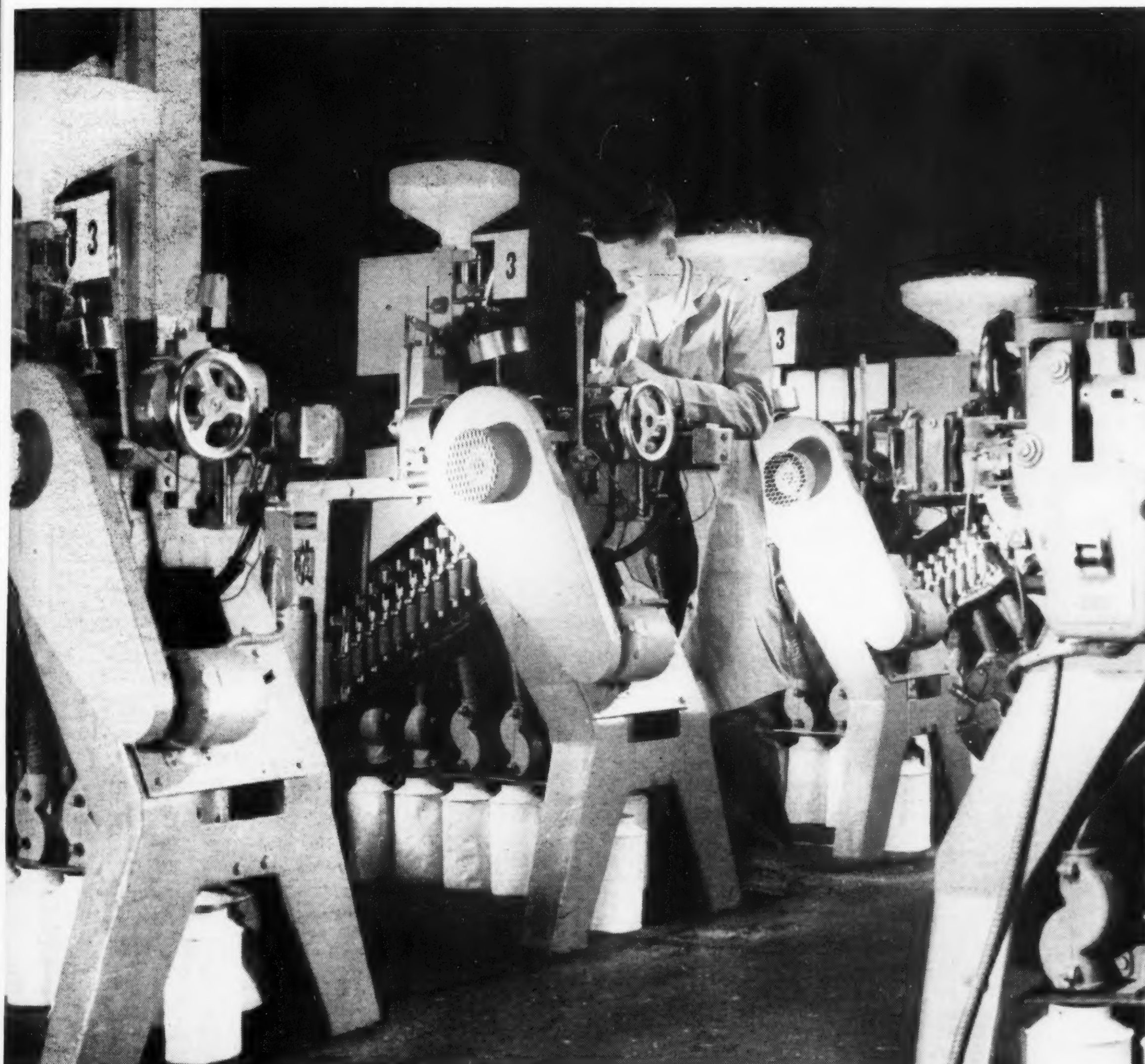
In <u>each</u> and <u>every</u> bearing, we match rollers to almost microscopic limits

NOT satisfied to finish rollers to extremely close tolerances, Timken Company engineers designed the special machines you see pictured below. They sort rollers into even more precise sub-sizes so we can match the rollers in *each* and *every* bearing to almost microscopic limits. Result: each roller carries the same load, assuring quieter operation, longer life.

This is typical of the many extra steps we take to give you more for your money than any other bearing manufacturer. In fact, only with Timken® bearings do you get *all* these advantages: advanced design, precision manufacture, rigid quality control, special analysis Timken steels. The end result is that every Timken bearing insures longer life, reduces friction and cuts maintenance costs to a minimum.

Whether you're buying or building machinery, specify Timken bearings. Or if you're replacing bearings, insist on Timken tapered roller bearings. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

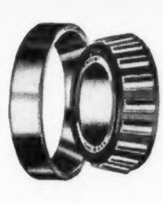
This symbol on a product means its bearings are the best.



TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS



NOT JUST A BALL ○ NOT JUST A ROLLER ⊂⊃ THE TIMKEN TAPERED ROLLER

BEARING TAKES RADIAL AND THRUST LOADS OR ANY COMBINATION

LOW in cost... HIGH in modulus

HUBER MODULEX—HMF THE ECONOMY BLACK

Economy-minded compounders are taking a fresh look at HMF black for blending with the higher-priced blacks. The quality of Modulex has been steadily improved over the years to make it the outstanding leader of the HMF group today.

MODULEX is non-staining.

MODULEX extrudes faster and with lower swell.

MODULEX produces higher cured physical properties.

WRITE for a working sample today.

J. M. HUBER CORPORATION, 100 Park Avenue, New York 17, N.Y.

HUBER

Manufacturers of
Channel Blacks
Furnace Blacks
Rubber Clays
Rubber Chemicals

INDIA

RUBBER WORLD

A Bill Brothers Publication

JANUARY, 1954

Vol. 129—No. 4

SUBSCRIPTION PRICES

United States, $5.00 per year; Canada, $6.00; all other countries, $7.00. Single copies in the U. S., 50¢; elsewhere, 60¢.

Other Bill Publications are: In Marketing, SALES MANAGEMENT, SALES MEETINGS, PREMIUM PRACTICE. In Merchandising, FLOOR COVERING PROFITS, FOUNTAIN & FAST FOOD, GROCER-GRAPHIC, TIRES — TBA Merchandising, YANKEE FOOD MERCHANT.

Copyright January, 1954
Bill Brothers Publishing Corp.

Table of Contents

Departments

Market Reviews

Statistics

India RUBBER WORLD assumes no responsibility for the statements and opinions advanced by contributors.

Editorial Advisory Board

C. H. ADAMS
JOHN BALL
P. D. BRASS
BERNARD H. CAPEN
C. C. DAVIS
J. H. FIELDING
S. D. GEHMAN
WILLIAM E. KAVENAGH
R. A. SCHATZEL
JOHN N. STREET

Published monthly by

BILL BROTHERS PUBLISHING CORPORATION

Editorial and Executive
386 Fourth Ave.,
New York 16, N. Y.
LExington 2-1760

Office of Publication
1309 Noble St.,
Philadelphia 23,
Pennsylvania

Chicago Office: 333 N. Michigan Ave.
STate 2-1266

B. BRITTAIN WILSON, *General Manager*
ROBERT G. SEAMAN, *Editor*
S. R. HAGUE, *Managing Editor*
ARTHUR M. MERRILL, *Associate Editor*
RUFUS H. FAIRCHILD, *Advertising Manager*
M. J. McCARTHY, *Circulation Manager*
M. A. LARSON, *Production Manager*

Chairman of Board and Treasurer
RAYMOND BILL

Vice Presidents
B. BRITTAIN WILSON
C. ERNEST LOVEJOY
WM. H. McCLEARY

President and General Manager
EDWARD LYMAN BILL

THERMATOMIC

CARBONS . .

P-33 (FT CARBON)

THERMAX (MT CARBON)

THERMAX-S (NON-STAINING)

. . *Well Known, Widely Used, Readily Available. High Individual Loadings Produce Easy Processing, Low Cost Compounds With Good Mechanical Properties. Combinations With Other Blacks Offer Many Compounding Advantages.*

R. T. VANDERBILT CO. INC.

230 Park Avenue, New York 17, N. Y.

INDIA
RUBBER
WORLD

VOL. 129—NO. 4 JANUARY, 1954

Compounding of Silicone Gums

C. W. Pfeifer,[1] R. M. Savage,[1] and B. B. White[1]

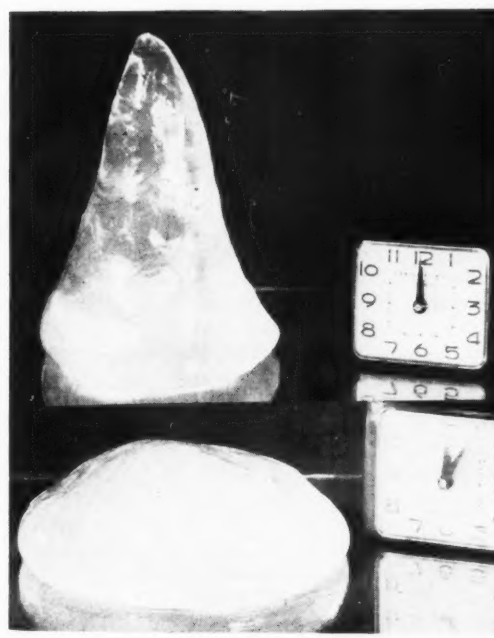


Fig. 1. Extent of Flow of SE-76 Silicone Rubber in Five Minutes at Room Temperature

TEN years have passed since the first commercial introduction of silicone rubber in compound form. Fabrication from silicone rubber compounds is quite familiar to a great many technical men in the rubber industry, and design engineers are making remarkable progress in the application of the unique properties of this relatively new material. Over the past ten years much has been published concerning the techniques of fabrication starting with silicone rubber compounds, and much has been published concerning the properties and applications of silicone rubber. There has been little necessity for the dissemination of compounding information on silicone gums, since most of the available material has been offered in compound form ready for fabrication.

More recently, with the usage of silicone rubber increasing at such a rapid rate and its technology advancing from infancy to adolescence, gums have been made available to the industry. Advantages to the fabricator of starting with gum rather than compound are not the subject of this discussion. It is our purpose to describe the available silicone gums and provide some basic information concerning their properties, mixing, and handling.

SE-76 Silicone Rubber

The gum having the greatest commercial importance, at present, is designated by G-E with the code SE-76. This product is a methyl siloxane polymer having practically no branching or cross-linking and an average molecular weight of 400,000 to 500,000. It is a water-white material having an extremely high viscosity (10,000,000-12,000,000 centistokes). A quantity of SE-76 polymer placed in a container will flow, within a matter of a few hours, to take the shape of its container. (See Figure 1.) Compounds made from SE-76 are used for the general-purpose type of mechanical goods, wire covering, and coating applications, where the unique properties of silicone rubber are desirable. Such compounds are used to fabricate rubber which has excellent heat resistance to 500° F. and as high as 600° F. for certain compounds. The same rubber is flexible as low as —65° F. Properties such as freedom from oxidation and ozone degradation are also obtainable from compounds made from SE-76 and the other silicone gums as well.

SE-51 Silicone Rubber

Second in importance in the list of three available gums is a product designated by the code SE-51. Chemically, this gum differs from SE-76 in that it has part of the methyl groups along the siloxane chain replaced with phenyl groups. The inclusion of phenyl groups along the siloxane chain gives a measure of disorder to the polymer molecule, thereby improving the low-temperature flexibility of the resulting rubber. The physical appearance of SE-51 and its milling characteristics are almost identical with the straight methyl siloxane polymer, SE-76. Applications, ordinarily in the aircraft industry, requiring extremely low-temperature flexibility utilize this type of silicone gum. Rubbers flexible at temperatures as low as —125° F., without sacrifice of the high-temperature stability common to all silicone rubber, can be made from SE-51.

[1] Silicone Products Department, General Electric Co., Waterford, N. Y.

SE-30 Silicone Rubber

The third member of the trio of silicone gums, SE-30, is a new product just becoming commercially available. It is a methyl silicone polymer having similar physical appearance and milling characteristics as its two predecessors. It differs in its ability to give improved rubbers with extremely low compression-set properties at high temperatures. Another feature of compounds made from SE-30 is its ability to give compounds which exhibit a minimum of shrinkage during cure. The low-shrinkage properties of compounds made from SE-30 are particularly attractive to mechanical goods molders who wish to convert molds designed for organic rubber molding over to silicone rubber molding.

Fillers and Reinforcing Agents

Having considered the types of silicone gum or polymer available, let us turn now to the types of fillers which are useful in this field.

We think at once of silica, a natural choice for the silicone system. Broadly speaking, we may divide the silicas into five classifications: aerogel, precipitated, vapor phase, special coated, and diatomaceous types. Santocel CS[2] is an example of the aerogel type. This is a slightly acidic filler containing small amounts of alcohol, water, and sodium sulfate as the chief impurities. The particle diameter is approximately 30 mμ, with a surface area of approximately 110-150 square meters per gram. It is useful in numerous applications both for high- and low-temperature molding and extruding stocks. Its chief limitation is the relatively high water absorption which it imparts to silicone stocks containing it. When Santocel CS is used as the only filler in the silicone gums which have been mentioned, tensile strengths will average from 600-900 psi. with elongation from 200-350%, depending upon cure conditions.

In the category of precipitated silicas, the material may be either acidic or alkaline. Impurities will be water and the sodium salt of the acid used for precipitation. Optimum reinforcement so far obtained with various precipitated silicas has averaged similar to that obtained with the aerogel mentioned previously. Water absorption characteristics of silicone rubber filled with precipitated silicas vary with the particular grade, depending largely upon the salt impurity in the silica. A grade in this category somewhat similar to Santocel CS, but exhibiting lower water absorption in the compounded stock, is Hi-Sil X303.[3] This material has an average particle diameter of 20-25 mμ, with surface area in the range of 140-160 m^2/g. Another grade which we believe useful is Hi-Sil XW.[3]

Vapor-phase silica is available in extremely fine particle size and high purity, with low moisture content. It is made from silicon tetrachloride. Acidity of the material may be varied by the amount of by-product hydrochloric acid retained. A typical product of this type is Aerosil,[4] having an average particle diameter of approximately 15-20 mμ, with surface area of 175-200 m^2/g. When Aerosil is used as the only filler, tensile strengths of 600-1,200 psi. with elongations of 200-600% are possible, again depending upon the extent of cure. The outstanding virtue of this-type silica is the low water absorption which stocks containing it possess.

The fourth classification, as indicated earlier, is the special coated silica. We refer here primarily to Du Pont Fine Silica,[5] or GS hydrophobic silica, as it was previously called. This is a slightly alkaline filler having an average particle diameter of approximately 10 mμ, and surface area of 275-300 m^2/g. Although presently limited to 300-350° F. top useful temperature, it is capable of 1,000-2,000 psi. tensile strength for applications over a wide temperature range below this limit.

The fifth classification of silicas to which we have referred is the naturally occurring diatomaceous type. We may further subdivide this into two groups which are important to the silicone rubber compounder. These are the heat calcined and flux calcined materials. Both are relatively free from organic contaminants, have no adverse effect on the vulcanizing systems usually employed, and are useful where low water absorption characteristics with moderate heat stability are essential. Particle sizes are much larger than those of the silicas already mentioned, ranging from 1-6 microns. The surface areas are larger than would be calculated from particle diameter owing to high internal area in this form of silica. In the heat calcined group such products as Celite 270[6] and Dicalite PS[7] are typical grades. In the flux calcined group Dicalite White[7] and Celite Super Floss[6] are useful products. Depending upon the exact formulations and cure, silicone rubber of 500-900 psi. tensile with 60-150% elongation is usually obtained.

Thus far we have discussed various fillers in the family of silicon dioxides. Although this makes up the most important classification for our purpose, many other fillers are useful.

Among the calcium carbonates, the precipitated types are important. Witcarb R,[8] Calcene NC,[3] Albacar 5970,[9] and Purecal U[10] should be considered. These materials all are less than 4 μ in particle diameter, and some average less than 50 mμ in particle diameter. Witcarb R is reported to have a surface area of 32 m^2/g. Some of these stocks are useful in paste and adhesive type of applications. None is particularly suited for general molding and extrusion work as low tensile strength and elongation are usually obtained.

Among red iron oxides one group is relatively important—that made by the calcination of hydrated iron oxide to yield fine particle size materials of high purity. A typical example is RY-2196.[9] This product, having an average particle size of less than 1 μ, gives moderate reinforcement as measured after a standard 480° F. oven cure. Tensile strength of 500-700 psi. and elongation of approximately 175-250% can be expected. The heat aging characteristics of such stocks are relatively good. In fact, iron oxide is sometimes used to improve the heat stability of silicone rubber stocks containing other fillers.

Turning now to titania pigments, we find two crystalline types, rutile and anatase. Both types are available as essentially neutral pigments having an average particle diameter in the range of 0.3 μ. Some are reported to have surface areas of approximately 9 m^2/g. Thus as a general statement, we may say that they are good for heat stability and are fair for reinforcing purposes. They have been used in molding stocks, but are perhaps currently more useful to the silicone compounder in paste-type compositions. In silicone formulations the rutile types yield slightly more resilient stocks than do those made from anatase fillers, which stocks are somewhat stiff or leather like. Examples of suitable titania pigments include Ti Pure R-110,[11] Titanox RA[12] and AMO,[12] and Unitane OR-342.[13]

In addition to the fillers already mentioned, several

---

[2] Monsanto Chemical Co., Merrimac Division, Boston 49, Mass.
[3] Columbia-Southern Chemical Corp., 420 Duquesne Way, Pittsburgh 22, Pa.
[4] Godfrey L. Cabot, Inc., 77 Franklin St., Boston 10.
[5] E. I. du Pont de Nemours & Co., Inc., organic chemicals department, Wilmington 98, Del.
[6] Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y.
[7] Great Lakes Carbon Corp., 18 E. 48th St., New York 17.
[8] Witco Chemical Co., 260 Madison Ave., New York 16.
[9] C. K. Williams Co., Easton, Pa.
[10] Wyandotte Chemicals Corp., Wyandotte, Mich.
[11] E. I. du Pont de Nemours & Co., Inc., pigments department, Wilmington 98.
[12] Titanium Pigment Corp., 111 Broadway, New York 6.
[13] American Cyanamid Co., Calco Chemical Division, Bound Brook, N. J.

others are of limited importance, which we will mention briefly.

Zinc oxide is sometimes used in combination with titanium dioxide. Aluminum oxide in the form of Alon C[1] may prove useful. In experimental work tensile strengths of more than 1,000 psi. have been obtained with excellent elongation. Lithopone is used occasionally. In the early days of silicone rubber work, and during the last war, this filler was frequently employed. Superpax,[14] a relatively fine grade of zirconium silicate, is a newcomer to the field of silicone rubber fillers. Although not suitable where tensile strength is of prime importance, this material is of interest where high heat stability is required. Stocks containing this as the only filler have withstood 600° F. exposure with good retention of flexibility.

Among the many clays very few are suitable for present-day use in silicone rubber. The chief disadvantage to all of them lies in the relatively poor heat aging which stocks of them possess.

Among the many carbon blacks we again find that none is particularly useful as reinforcing agent for silicone rubber. Many interfere with the presently used vulcanizing system. Several have a deleterious effect on heat aging characteristics.

Pertinent information on some of the fillers discussed herein is summarized in Table 1.

TABLE 1

Filler	Particle Diameter	Surface Area, $\frac{m^2}{g}$	Approx. pH	Specific Gravity
Santocel CS	30 mμ	110–150	3.5–4.5	2.2
Hi-Sil X303	20–25 mμ	140–160	7.0–8.0	1.95
Aerosil	15–20 mμ	175–200	4.5–6.0	2.0
Du Pont Fine Silica	10 mμ	275–300	7.5–9.5	1.98
Celite 270	1–6 μ		7.0	2.15
Celite Super Floss	2–4 μ	20	8.5	2.3
Witcarb R	30–50 mμ	32	11.3	2.65
Iron Oxide RY-2196	<1 μ			4.95
Titanox RA	300–400 mμ		7.0	4.2
Alon C	20–40 mμ	50–120	4.5–7.0	3.6
Superpax	<5 μ			4.5

Vulcanizing Agents and Other Additives

Having discussed the available silicone polymers, reinforcing agents, and suitable fillers, the vulcanizing system should be considered briefly.

All silicone rubber vulcanization depends in part upon free radical mechanisms. The most frequently used agent is benzoyl peroxide, although the liquid tertiary butyl perbenzoate is also suitable and in use. Benzoyl peroxide is available in several forms. Fine powders[15] by McKesson and Robbins and paste products[16] containing 50% peroxide in silicone oil, from the same companies, are recommended. The amount of peroxide used varies with the formulation and properties desired, usually averaging between 1.5 and 3.0% on the silicone gum weight.

At the present state of development, most silicone rubber formulations are very simple in contrast to other recipes with which the compounder is familiar. Many silicone stocks contain only gum, filler, and vulcanizing agent.

Special additives are used primarily for improvement of compression set. The earliest additives used for this purpose, and still in use, are the oxides of mercury. More recently cadmium compounds have also been used. The chief disadvantage of both of these types of material is their toxicity. Very recently formulations have been published, and stocks introduced containing 2,5 ditertiary butyl quinone to improve compression set characteristics. This material is essentially non-toxic. The amount of additive to use roughly parallels the amount of peroxide used.

Additives are sometimes used in other special instances to control processability or to modify heat aging characteristics, but there are no general statements which can be made here.

To illustrate the range of silicone rubber compositions, several typical formulations are presented in Table 2.

TABLE 2

	A	B	C	D	E	F	G	H
SE-76	100	—	100	100	100	—	100	100
51	—	100	—	—	—	—	—	—
30	—	—	—	—	—	100	—	—
Santocel CS	42	40	—	—	—	—	—	—
Celite Super Floss	—	—	90	100	—	—	—	—
270	—	—	—	—	90	100	—	—
Witcarb R	—	—	—	—	—	—	—	50
Du Pont Fine Silica	—	—	—	—	—	—	40	—
Benzoyl peroxide	1.6	2.0	1.75	1.7	1.8	1.6	1.6	3.0
Mercurous oxide	—	—	—	1.7	—	1.6	—	—
2–5 ditertiary butyl quinone	—	—	—	—	1.8	—	—	—

A and B are general purpose molding and extruding stocks at about 50 durometer. The latter has unusually low temperature flexibility.

C, D, and E are 70-durometer stocks illustrating the use of diatomaceous silicas to produce stocks of varying compression-set characteristics.

F is typical of extremely low set stocks having unusually low shrinkage.

G is a stock with unusually high tensile strength for silicone rubber. It is limited to 300°-350° F. service.

H indicates the type of composition useful in bonding and coating applications. Note the higher percentage of benzoyl peroxide required.

We have discussed the ingredients of silicone rubber compounds; let us now consider the equipment and techniques of the mixing operation.

Equipment for Mixing Silicone Gums

With only minor modifications, equipment common to the rubber industry is used in compounding silicone rubber. The ordinary two-roll differential-speed rubber mill, equipped with water cooling, has been found completely satisfactory. Differential speed ratios of the rolls of 1.1:1 to about 1.4:1 have been found to be most practicable for the mixing operation. Surface speeds of 75 to 150 feet a minute may be used.

Some silicone rubber compounds are weak in the raw condition and cannot be worked by the usual mill-knife cutting and folding operation. Mills used primarily for handling these weak compounds have been equipped with full-length scraper blades across the fast roll. A workable substitute for the full-length scraper blade is a shorter blade mounted on a sliding bar.

To minimize the potential hazard of continuous exposure to finely divided silica dust, and also to eliminate possibility of mercury vapor concentrations when mercurous oxide is used in a formulation, mills are sometimes provided with hoods and connecting blowers.

Mill Mixing

The mill mixing operation does not differ greatly from that used with organic rubbers. Silicone gums are soft and easily worked; no breakdown is needed. The gum bands on the roll immediately, and filler addition may be started at once.

The mill bite is set so that a slight rippling bank is maintained. The filler is added at a slow, even rate, preferably just about as fast as the gum will accept it. Most uniform results have been obtained with little excess filler in the bank. Reasonably slow addition of the filler yields more uniform dispersion and better stress-strain properties in the cured stock than faster addition.

When the vulcanizing agent is added, it is important that the batch temperature not exceed 110° F., or scorching may occur. Only a small quantity of cooling water is required since silicone rubber exhibits very little tendency to build up excessive heat.

Unlike with most organic rubber compounds, the order

[14] National Lead Co., Titanium Alloy Mfg. Division, 111 Broadway, New York 6.
[15] Luperco fine purified benzoyl peroxide—Lucidol Division, Novadel Agene Corp., 1740 Military Rd., Buffalo, N. Y.
Benzoyl peroxide, 99% purified-200—McKesson & Robbins, Inc., 155 E. 44th St., New York 17.
[16] Luperco AGE—Lucidol Division.
Cadox SG—McKesson & Robbins.

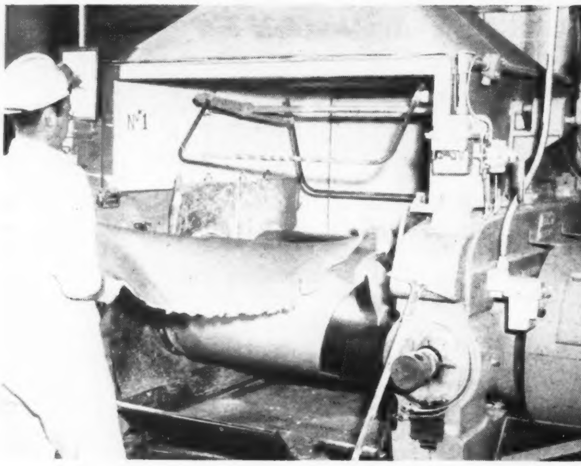


Fig. 2. Normal Mill Mixing of Silicone Rubber Stocks

Fig. 3. Mill Mixing of Weak Silicone Rubber Stocks Requiring Scraper Blade

of addition of silicone rubber compound ingredients is usually not important. The general practice has been to add the main filler to the gum first, followed by any additional filler, additive, or color pigment, and then the required vulcanizing agent, in about that order.

Since the development of benzoyl peroxide-silicone oil pastes, it has been advantageous in many cases to add the paste to the gum first, in the interest of better dispersion and to eliminate excessive dusting of the powdered peroxide. Masterbatching of additives in silicone gum has also been found desirable. Mercurous oxide and ditertiary butyl quinone are added in this manner. Such masterbatches are best added to gum before the filler addition.

Normal rubber mill techniques of blending work successfully with some silicone rubber compounds, particularly those containing appreciable amounts of a structure-building filler such as Santocel CS or other finely divided silica. (See Figure 2.) For weaker compounds a mill equipped with a scraper blade is used, and blending is accomplished by cutting all or part of the batch from the mill with the scraper blade (see Figure 3), then returning the stock to the bite after turning it 90 degrees. In either case a half-dozen blending passes have usually been found sufficient.

Silicone rubber batch sizes tend to be a little smaller than the usual organic rubber batch sizes because a somewhat tighter nip is required. The optimum batch size, of course, varies inversely with the loading of the compound. With a silica gel such as Santocel CS as filler and a loading of about 20 volumes per 100 volumes of SE-76 gum, 100-pound batches have been successfully mixed on 60-inch mills. With higher loaded stocks, such as 50 volumes of a diatomaceous earth filler, 50-pound batches on a 60-inch mill are about optimum.

The complete mixing of a batch usually requires about 30 to 60 minutes on a production mill, varying, of course, with the formulation, the batch size, and the speed and friction ratio of the mill.

Silicone gums are plastic, and the initial incorporation of filler in the gum occurs readily. However, the complete wetting of the individual particles of filler by the gum is a much slower process. For this reason optimum properties are not achieved until the mixed compound is allowed to rest for a period of time after the mixing operation. The required period of time has been found to vary from about 24 hours for lightly loaded compounds employing non-reinforcing or semi-reinforcing fillers to about three or four days for heavily loaded stocks using the same fillers. Compounds based on reinforcing fillers such as

Fig. 4. Effect of Shelf Aging on Properties of Cured SE-450 Silicone Rubber

Santocel CS exhibit changing cured properties for several days after mixing and require as much as three weeks' aging before stable properties are developed. The effect of aging time on the cured properties of such a compound is shown clearly in Figure 4.

Banbury Mixing

We have had some excellent success with Banbury mixing of silicone rubber. Our work so far has been performed in a 1-A Banbury, which must be considered as experimental or pilot-plant equipment.

As is true in Banbury mixing of other rubbers, the technique of addition of ingredients and optimum batch size must be worked out for each formulation. A typical technique that has worked successfully on experimental batches of a compound containing approximately 45 volumes of a diatomaceous earth filler to 100 volumes of SE-76 gum is herewith described.

The polymer is added all at once with the Banbury running at slow speed, and the entire quantity of filler is added immediately. The ram is operated up and down several times, using 80 to 100 pounds of air pressure. The chamber is then inspected to make sure that all dry filler is incorporated in the batch. The ram is lowered, and the batch is milled at high speed for several minutes. The exact time varies slightly with the plasticity of the gum, filler particle size and quantity, etc. Despite the cooling water running during the entire operation, the temperature rises to approximately 230 to 250° F. For this reason the vulcanizing agent cannot be added in the Banbury.

The batch is dropped on a sheeting mill and milled until cooled below 100° F., which operation requires just a few minutes. The benzoyl peroxide is then added, and a few blending passes complete the operation. A batch between 30 and 40 pounds can be dropped from the Banbury every five to eight minutes.

(Continued on page 488)

Electrical Resistivities of Carbon Black Loaded Rubber Compounds[1]

Merton L. Studebaker[2]

NATURAL rubber is an insulating material. Its conductivity can be increased by incorporating carbon black into it. Both the nature of the carbon black and its amount are important. The resistivities of these loaded vulcanizates are of considerable technical importance, and a number of very good studies has been made on them, particularly in the last 10 or 15 years. The literature to 1945 was reviewed by Bulgin (1),[3] and this classical study should be consulted for background.

Briefly, carbon black is considered as being agglomerated in rubber to form conducting paths or chains (1-4). The treatment which the sample receives before, during, and after vulcanization is important in the results. The different types of carbon black behave differently under a given treatment; and although numerous experiments have been reported (1, 5-13, etc.), one should be cautious in predicting the behavior of a new compound.

The resistivity decreases during vulcanization, and both sulfur and accelerator exert an effect (8, 9, 12). Flexing increases the resistivity of the samples, presumably owing to "chain-breaking." The resistivity of the flexed samples decreases slowly during relaxation at room temperature or more rapidly and more completely at elevated temperatures (8, 13). The resistivity is also increased when the sample is swollen by swelling agents. Choice of polymer and compounding affect the absolute values obtained. We shall be concerned here with only one aspect of the problem: namely, the nature and the amount of carbon black in the vulcanized rubber. We have tried to eliminate the other factors from our results.

We know few really fundamental properties of carbon black (14, 15). At the present time these seem to be (a) particle size and the related property, (b) surface area, (c) oxygen content, (d) hydrogen content, and, finally, a property which for lack of a better term we shall refer to as (e) a "structural" factor. This last property is difficult to pin down, but it manifests itself in a number of ways. It is related to the tendency of the particles to agglomerate, although this agglomeration seems to be influenced also by each of the first four properties of the carbon black. We try to get a feel of the "structural" factor through such tests as oil absorption, sedimentation volume, etc. However, because of the interrelation between the different properties this "structural" factor has not been satisfactorily defined, let alone measured. It is probably a result of the organization of the carbon atoms in the ultimate carbon black particle, and we hope that precise X-ray analyses will aid us in studying it.

Scope of This Study

It is the purpose of this paper to try to establish a relation between the resistivities of a series of natural rubber stocks and the fundamental properties of the carbon blacks which they contain. Eight commercial carbon blacks at five different loadings were used in this study. We have been able to develop a satisfactory relation among the *resistivities* of the vulcanizates, the *carbon black loading*, the *hydrogen contents*, and the *surface areas* of the carbons which applies over a considerable range of loadings. The data for six of the carbons fit this relation within the estimated experimental error. The two exceptions, *Thermax* and *CK-4*, are considered separately.

The rubber samples were made up as a portion of another study, reported in part before the Deutsche Kautschuk-Gesellschaft at Goslar, Germany, this year (15). The test sheets were prepared in our Philblack sales service laboratory in Akron and shipped to the Phillips Petroleum Co.'s Philtex experiment station laboratory at Phillips, Tex., where the resistivity measurements were made. The test samples were relaxed at room temperature for one week before testing, but the control of flexing during shipment was questionable, and the test results could possibly be improved by more careful control of flexing, or better by relaxing in an oven at about 100° C. (8). It is believed, however, that the results are sufficiently precise to illustrate adequately the relation which was developed. Standard practices were followed in making the measurements, and the procedure was the same as was used in our other studies (10, 11). McKinney and Roth (8) have shown how the resistivity of carbon black loaded rubber stocks decreases as vulcanization proceeds; it decreases rapidly at first, but changes very little with advanced states of cure. Accordingly, to avoid complications in determining state of cure, the resistivities reported here were all made on sheets which had been vulcanized for 90 minutes and which were definitely over-cured.

Development of Empirical Equation

Kemp and Hermann(3), Habgood and Waring(4), and others have pointed out that carbon black particles are flocculated in rubber to form conducting paths. Since the number of particles varies inversely with the cube of the particle diameter, the number of conducting paths and, hence, the conductivity will presumably increase very rapidly with decrease in particle size.

In our work we had available surface area values made by the B.E.T. (nitrogen adsorption) procedure (16). Other work has shown that the carbon blacks studied here are essentially non-porous; hence we can use the surface area measurements as a good indication of the particle size.

Although, as was pointed out by others (1, 2, 13), there appears to be a rough relation between the resistivities of rubber vulcanizates and the surface areas of the carbon blacks which they contain, it is evident that some other factor or factors must also be involved. One obvious property to try to correlate with surface area and resistivity at a given loading, R_X, is the value of the

---

[1] Presented before the Swedish Institute of Rubber Technology, Gothenburg, Sweden, June 4, 1953.

[2] Phillips Chemical Co., Akron, O.

[3] Numbers in parentheses refer to Bibliography items at end of this article.

TABLE 1. PROPERTIES OF CARBON BLACKS AND EXPERIMENTAL LOG RESISTIVITIES OF VULCANIZATES*

Carbon Black	% Hydrogen	Surface Area (M.²/g.)	Log (Surface Area)	Log Resistivity @ Various Carbon Black Loadings: 20 Parts	35 Parts	50 Parts	75 Parts	100 Parts
Philblack O (HAF)	0.30	74	1.87	14.2	6.4	4.4	3.4	3.6
Philblack A (MAF)	0.36	42	1.62	14.3	10.4	7.0	4.9	4.4
Acetylene black	0.07	58	1.76	13.8	6.6	3.2	2.5	2.4
Pelletex (SRF)	0.39	28	1.45	14.3	14.1	8.4	4.4	4.1
Philblack E (SAF)	0.31	131	2.12	8.6	3.9	3.1	2.7	No stock—scorched on mill
Thermax (MT)	0.31	8	0.90	14.3	14.3	14.1	14.0	8.7
CK-4 (German)	0.88	95	1.98	13.9	7.5	6.5	4.9	5.3
Spheron 9 (EPC)	0.65	109	2.04	13.9	8.9	7.4	6.5	5.9

*Compound:	Parts
Smoked sheet	100
Zinc oxide	5
PBNA	1.
Stearic acid	3.
Paraflux 2016	5.
Santocure	0.45 (except 0.7 for Spheron 9 compounds)
Sulfur	2.5
Carbon black	20, 35, 50, 75, and 100

†From Equation: $\log R = -a \times \log(\text{surface area}) + b \times \%\ \text{hydrogen} + c$
where: $\log a = -2.78 \times \log(\text{weight}\ \%\ \text{carbon black}) + 4.89$ and
$\log c = -2.95 \times \log(\text{weight}\ \%\ \text{carbon black}) + 5.47$

CALCULATED LOG RESISTIVITIES

Carbon Black	Calculated Resistivities @ Various Carbon Black Loadings†: 20 Parts	35 Parts	50 Parts	75 Parts	100 Parts
Philblack O	26.9	7.6	4.7	3.5	3.3
Philblack A	38.1	11.4	6.8	4.8	4.4
Acetylene black	29.0	6.7	3.0	1.5	1.2
Pelletex	46.0	13.8	8.1	5.6	5.0
Philblack E	15.2	4.6	3.2	2.9	3.0
Thermax	69.9	20.0	9.8	6.4	5.1
CK-4	27.2	11.9	9.8	9.0	8.9
Spheron 9	22.2	9.0	7.1	6.5	6.5
Weight % carbon black	14.6	23.0	29.95	39.1	46.5
a in equation (2)	44.7	12.6	6.17	2.88	1.78
c in equation (2)	107.0	28.2	13.2	5.89	3.63

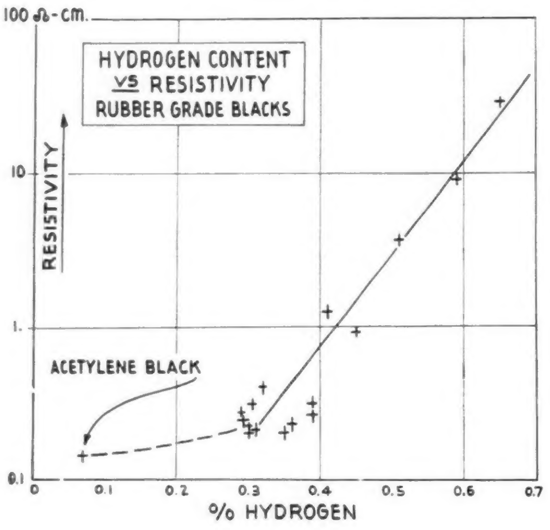


Fig. 1. Hydrogen Content vs. Resistivity—Rubber Grade Blacks

resistivity at infinite loading, R_x, i.e., the resistivity extrapolated to pure carbon black.

A rather promising relation was worked out among this *extrapolated resistivity*, R_x, the *surface area* of the carbon black, and the *resistivity at a given carbon black loading*, R_X. This procedure, however, is subject to a very serious objection: namely, that there is no really good basis for making the extrapolation. Bulgin(1) gave the following equation which related fractional carbon black loading with resistivity:

$$(1) \qquad R = e\left(\frac{a}{F}\right)^{P}$$

where R is the resistivity at fractional loading, F; e is the base of the natural logarithms, and a and P are constants which depend upon the type of carbon black. Bulgin stated that this equation held over a wide range of carbon black loadings. We have found that some data fit the Bulgin equation(1) over a range of loadings, but that other data do not. This equation is not considered a suitable basis for extrapolation for the majority of the data which we have examined.

Elsewhere (14, 15) we have reported that the resistivities of dry carbon blacks at a given pressure are dependent upon their hydrogen contents. This point is illustrated in Figure 1.

Bulgin stated that his carbon black loading-resistivity

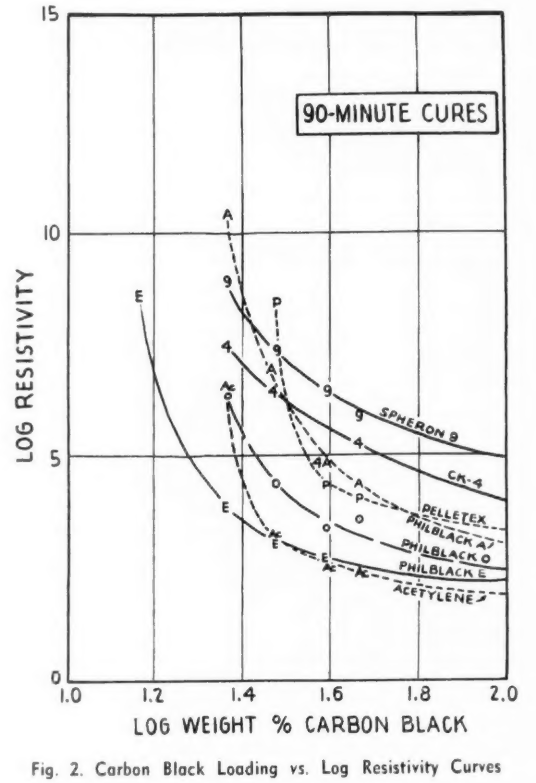


Fig. 2. Carbon Black Loading vs. Log Resistivity Curves

curves, when extrapolated to infinite loading, gave values similar to those determined experimentally. When we extrapolated the data in Table 1, as in Figure 2, we obtained resistivities which were greater than the values for dry carbon black at any pressure. We did, however, plot these values for resistivity extrapolated to infinite loading, R_x, against hydrogen content, as in Figure 3. The similarity of the curves in Figures 1 and 3 suggested the use of the hydrogen content in our attempted correlation.

We have, then, two fundamental properties of carbon blacks, *hydrogen content* and *surface area* (or better, particle size), which we might expect to correlate with the resistivities of carbon black containing rubber stocks. Empirically, the following equation was found which seems to be generally applicable:

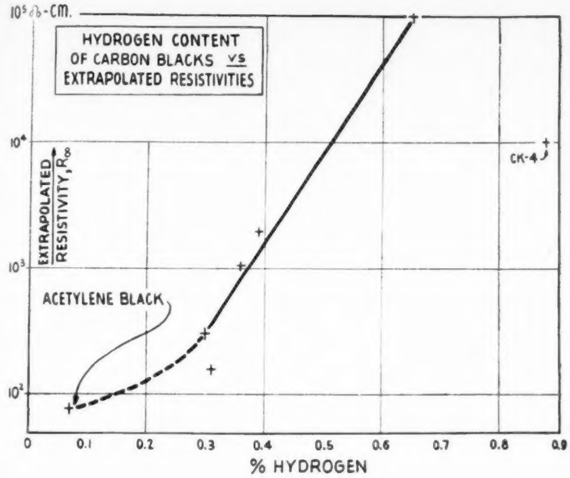


Fig. 3. Hydrogen Content of Carbon Black vs. Extrapolated Resistivities

(2) $\log R = -a \times \log (\text{surface area}) + b \times (\%\ \text{hydrogen}) + c$

This general equation seems to hold satisfactorily for loadings of most carbon blacks of 35 parts or more per 100 parts of rubber, or more accurately, for log resistivities of 12.0 or less.

The exceptions in our study are Thermax and CK-4. For the data in Table 1, the constant, *b*, was found to be equal to 10.0 for all loadings. The constants, *a* and *c*, were related to the carbon black loading, expressed as *weight % carbon black*, by the following relations:

(3) $\log a = -2.78 \times \log (\text{weight}\ \%\ \text{carbon black}) + 4.89$, and

(4) $\log c = -2.95 \times \log (\text{weight}\ \%\ \text{carbon black}) + 5.47$

Testing the Relation

To illustrate the type of correlation which can be expected, Table 1 lists the experimental and the calculated values for the logarithms of the resistivities of vulcanizates containing various carbon blacks at loadings of 35, 50, 75, and 100 parts of natural rubber. The calculated log resistivities for the six blacks which obey the equation (Philblack A, Philblack O, Philblack E, Pelletex, acetylene black, and Spheron 9) are plotted against the experimentally determined values in Figure 4. The differences between the experimental and the calculated values are about equal to the estimated experimental error.

Figure 5 is the same as Figure 4 except that the values for the rubber stocks loaded with Thermax and CK-4 are included. These two carbons do not obey the relation represented by equation (2). CK-4 behaves like a carbon black with about 0.47% hydrogen instead of the 0.88% which was found by combustion analysis. Now CK-4 contains a considerable amount of material which can be extracted with organic solvents which accounts for at least part of the deviations from the general relation. The hydrogen content of such extractable matter is comparatively high. Accordingly, the measured hydrogen content of the carbon black is higher than it would be if the carbon had been extracted. If a value of 0.47% is used in calculating the logarithms of the resistivities, they will fit the line in Figure 4 as well as the data for the other kinds of carbon black. Incidentally, in the United States it is customary to keep the extractable

CARBON BLACK LOADING	SYMBOL	EQUATION
35 PHR	+	$R_{35} = -12.6 \times \log(\text{SURFACE AREA}) + 10.0 \times \%\ \text{HYDROGEN} + 28.2$
50 "	•	$R_{50} = -6.17 \times \log(\text{SURFACE AREA}) + 10.0 \times \%\ \text{HYDROGEN} + 13.2$
75 "	o	$R_{75} = -2.88 \times \log(\text{SURFACE AREA}) + 10.0 \times \%\ \text{HYDROGEN} + 5.89$
100 "	△	$R_{100} = -1.78 \times \log(\text{SURFACE AREA}) + 10.0 \times \%\ \text{HYDROGEN} + 3.63$

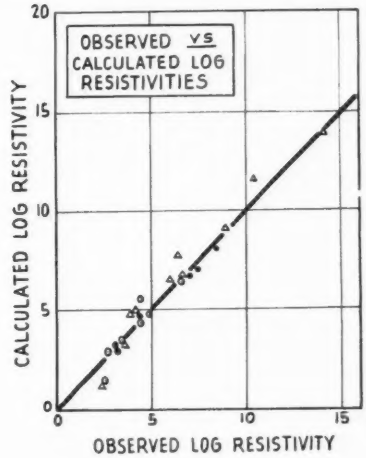


Fig. 4. Observed vs. Calculated Resistivities (Includes Data for Philblack A, Philblack O, Philblack E, Pelletex, Spheron 9, and Acetylene Black)

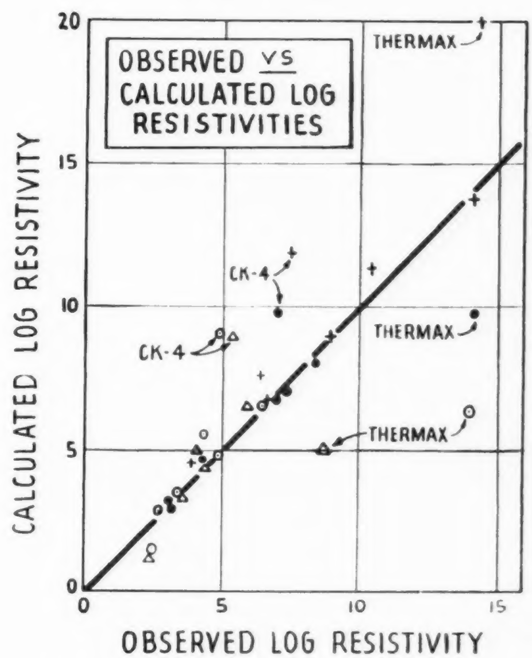


Fig. 5. Observed vs. Calculated Resistivities—All Data

matter rather low on all commercial blacks, except P-33 (fine thermal black).

In the case of Thermax, we are dealing with a carbon black which has a comparatively large particle size. It appears that associated with this large particle size are deviations in rubber properties of which the electrical resistivity is only one example. A good explanation of these deviations has not been given, but they are frequently encountered in Mooney viscosity data and some modulus results. It is perhaps too much to expect that

particle size-resistivity data will extend continuously into the range of very large particles. In such cases particle-to-particle contact may be restricted due to the greatly reduced number of particles present in the rubber. At any rate there seems to be a practical limit to our ability to extend particle size-resistivity considerations to loaded rubber which contains materials having large particle size.

Summary and Conclusions

We have been able to correlate the resistivity data for a series of natural rubber stocks with the *weight % of carbon black*, the *hydrogen contents*, and the *surface areas* of non-porous carbons. The equation (2) presented here is purely empirical, and no physical significance should be attached to it, aside from the fact that it represents the data over the usual range of loadings for conducting stocks. It seems to include the significant properties of carbon black which determine the resistivities of the vulcanizates studied. We have no doubt but that other mathematical equations could be found to represent the experimental data. The chief justification for equation (2) is that it works.

It has been somewhat surprising to us that it has not been necessary to introduce a "structural" or "agglomeration" factor. Perhaps studies on flexed samples would indicate the necessity of including a variable of this nature.

Others have indicated that the resistivity of loaded stocks seemed to be related to the resistivity of the dry carbon black, whether obtained by direct measurement on compressed samples or by extrapolation of resistivity-loading curves. We feel, however, that this direct attack through the use of hydrogen content and surface area or particle size offers a more promising approach for fundamental work.

The present study treats only a limited aspect of the resistivity of loaded vulcanizates. We have extended it to cover data from another laboratory on neoprene and GR-S, and the general equation (2) applies to that as well. However it would be interesting to extend the work in other polymers, different flexing treatments, and various states of cure.

Bibliography

(1) D. Bulgin, *Trans. Inst. Rubber Ind.*, 21, 188 (1945).

(2) D. Parkinson in "Advances in Colloid Science," Vol. II, p. 389, Interscience Publishers, Inc., New York (1946).
British J. Applied Phys., 2, 273 (1951).

(3) A. R. Kemp, D. B. Hermann, "Proceedings of the Rubber Technology Conference—1938," p. 893. W. Heffer & Sons, Ltd., Cambridge, England (1938).

(4) B. J. Habgood, J. R. S. Waring, *Trans. Inst. Rubber Ind.*, 17, 50 (1941).

(5) E. M. Dannenberg, *Ind. Eng. Chem.*, 44, 813 (1952).

(6) United States patent No. 2,118,601. R. Gerke, G. H. Ganzhorn, L. H. Howland, H. M. Smallwood, assigned to United States Rubber Co. (May 24, 1938).

(7) B. C. Barton, G. H. Ganzhorn, "Chemistry in Carbon Black Dispersion." Paper presented before the Division of Rubber Chemistry, American Chemical Society, Los Angeles, Calif., meeting, Mar. 19, 1953. For abstract see India Rubber World, Feb., 1953, p. 660.

(8) J. E. McKinney, F. L. Roth, *Ind. Eng. Chem.*, 44, 159 (1952).

(9) G. K. M. Pfestorf, *J. Indian Inst. Sci.*, 35, 39 (1953).

(10) L. R. Sperberg, J. F. Svetlik, L. A. Bliss, *Ind. Eng. Chem.*, 41, 1641 (1949).

(11) L. R. Sperberg, G. E. Popp, C. C. Biard, *Rubber Age (N. Y.)*, 67, 561 (1950).

(12) "Columbian Colloidal Carbons." Columbian Carbon Co., New York (1938).

(13) For a very comprehensive study of the effect of flexing see: B. B. S. T. Boonstra, E. M. Dannenberg, "Electrical Conductivity of Rubber-Carbon Black Vulcanizates." Paper delivered before the Rubber Division, A. C. S., Buffalo, N. Y., meeting, Oct. 30, 1952. For abstract see India Rubber World, Oct., 1952, p. 89.

(14) M. L. Studebaker, "The Ultimate Analysis of Carbon Black. I-II." Papers delivered before the Rubber Division Los Angeles meeting, Mar. 19, 1953. For abstract see India Rubber World, Feb., 1953, p. 661.

(15) M. L. Studebaker, "Some Recent Concepts in the Colloid Chemistry of Carbon Black and Its Reinforcement of Rubber." Paper delivered before the Deutsche Kautschuk-Gessellschaft, Goslar, Germany, May 8, 1953.

(16) S. Brunauer, P. Emmett, E. Teller, *J. Amer. Chem. Soc.*, 60, 309 (1938).

Silicone Gums

(*Continued from page 484*)

An alternative technique sometimes used has been to add the silicone gum to the Banbury, followed by the peroxide in paste form, followed by the filler. The batch is then discharged to a water cooled two-roll mill for final mixing when the temperature of the batch reaches 110° F.

To prevent contamination from lubricating materials, the dust stops on the Banbury have been run dry.

We have also successfully mixed silicone rubber in a dough-mixer equipped with dispersion blades. Such equipment seems to be ideally suited for certain types of formulations.

Humidity Effects

Atmospheric humidity conditions may have a material effect on some silicone rubber compositions, both during the compounding operation and in subsequent storage. Forty per cent relative humidity is a satisfactory humidity level for compounding. When the humidity falls below 25% R.H., difficulty is sometimes experienced with filler agglomeration due to static electrical charges. For storage of uncured compound, humidity in the range of 25-50% has been found optimum.

Cleanliness

Much emphasis has been placed on the high degree of cleanliness necessary in the compounding of silicone rubber. This emphasis is not misplaced and can bear repeating. Contamination of silicone gums or compounds is much more serious than with other rubbers. Contamination by organic rubbers, lubricating oils or greases, or millroom dirt will cause high-temperature failure of silicone rubber. Traces of rubber antioxidants or accelerators may cause failure to cure. For this reason extremely thorough cleaning of equipment used with organic rubber is mandatory before silicone rubber can be handled on the same equipment. This includes removing end guide-plates on mills, washing with solvents, etc. The ideal way to eliminate this costly procedure is, of course, to set aside separate equipment for the weighing and mixing of ingredients for silicone rubber compounds and for the handling of compounds prior to fabrication.

Conclusions

Silicone rubber technology has made giant strides in its short ten-year history. Now that silicone gums are available to the rubber industry, many laboratories will be contributing their compounding "know how" to the store of knowledge. As great as have been the advances of the past decade, we predict that progress during the next ten years will be even more rapid.

PVC Plasticizers

TWO low-temperature plasticizers for polyvinyl chloride resins have been announced as commercially available from Monsanto Chemical Co., St. Louis, Mo. They are Di (2-ethylhexyl) adipate (DOA) and Di-n-octyl, n-decyl phthalate (DNODP).

DOA is described as imparting to resins excellent low-temperature flexibility, as well as heat and light stability, and is reported to be useful for controlling the viscosity of plastisols. DNODP is also claimed to impart the above properties, in addition to those of low volatility and water resistance. Both plasticizers are recommended for use in garden hose, film, and fabric coatings, and in vinyl plastisols for toys, footwear, etc.

An Instrument for Determining the Relaxation and Recovery of Elastomers[1]

B. G. Labbe[2] and W. E. Phillips[3]

THE authors have had a number of requests for this paper during the last three or four years, and its publication, though late, therefore seems desirable. Some revisions have been included to bring the references more nearly up to date. EDITOR.

THE search for an improved test method to determine the properties of elastomers at low temperatures has uncovered a wide variety of methods. The majority of these procedures employs equipment formerly used at room temperatures, or equipment modified to permit operation at temperatures as low as —80° C. The Gehman low-temperature test,[4] determination of Young's modulus,[5] resilience by the Yerzley oscillograph,[6] and the T-50 relaxation[7] tests are a few of the more prominent procedures available at present. The ASTM compression set test method B[8] has been quite popular for determining permanent set of elastomers at elevated temperatures and has also been used at temperatures as low as —70° F. While this method shows what will happen when the sample is allowed to recover freely after compression, it does not indicate the force required to compress the sample or the rate of relaxation of forces within the sample during compression resulting from changes in time or temperature.

The development of freeze resistant polymers and the testing of the compounded stocks showed the need for an instrument that would determine the force required to produce definite degrees of compression at temperatures as low as —70° F. and indicate both the rate of relaxation of the load and the change in load when the platens are separated after compression.

MacDonald and Ushakoff[9] described an instrument in which a test specimen can be subjected to a definite percentage compression or to any given load and which, by means of a strain gage and recording device, shows the relaxation of the forces within the test specimen as time progresses. The Government Laboratories designed a similar instrument which permits gradual instead of instantaneous loading of samples, enables the operator to increase and decrease the compression during the test, and provides means of determining the recovery characteristics of specimens under test.

Description of Instrument

A schematic drawing of the instrument is presented in Figure 1. The overall height is about 14 inches, and the diameter, 5½ inches. The jig used to compress the test specimen consists of a Baldwin[11] SR-4 Type C load cell of 2,000-pound capacity, a gear and screw arrangement to permit application of the load to the test specimen, and a crank and counter assembly to indicate the thickness of the loaded test specimen. The height of the lower platen is changed 0.05-inch by one complete revolution of the large gear. The ratio of the large gear to the crankshaft gear is 5:1; thus one revolution of the latter raises or lowers the platen 0.01-inch. The dial on the crankshaft at the counter is graduated in tenths and provides the means of reading a height change of 0.001-inch. A Foxboro[11] Dynalog measures the voltage output of the strain-gage bridge to record the force exerted by the test pellet.

Procedure

The following compounding recipes and the elastomers indicated were used in this investigation:

GR-S	
GR-S	100.
EPC black	50.
Zinc oxide	5.
Stearic acid	1.5
Paraflux*	5.
Santocure (N-cyclohexyl-2-benzothiazole sulfenamide)†	1.2
Sulfur	1.75

Natural Rubber	
Smoked sheet	100
EPC black	50
Zinc oxide	5
Stearic acid	3
Paraflux	3
AgeRite Powder (Phenyl-beta-naphthylamine)‡	1
Captax (Mercaptobenzothiazole)‡	1
Sulfur	3

Hycar (OR-25)	
Hycar (OR-25)¶	100
SRF black	100
Zinc oxide	5
Dibutylphthalate	25
Altax (Benzothiazyl disulfide)‡	1
Sulfur	1

Polybutadiene	
Polybutadiene (polymerized at 122° F.)	100.
EPC black	50.
Zinc oxide	5.
Stearic acid	1.5
Paraflux	5.
Santocure	1.2
Sulfur	1.75

GR-I	
GR-I	100.
EPC black	20.
SRF black	30.
Zinc oxide	5.
Petrolatum	3.
Captax	0.5
Methyl tuads (tetramethyl thiuram disulfide)‡	1.0
Sulfur	2.0

Neoprene (GR-M)	
Neoprene	100
Neozone A (Phenyl-alpha-naphthylamine)§	2
Stearic acid	0.5
Light calcined magnesia	4.
MT black	57.6
Petroleum process oil	20
Sulfur	1.
Zinc oxide	5.

*C. P. Hall Co., Akron, O.
‡R. T. Vanderbilt Co., 230 Park Ave., New York, N. Y.
†Monsanto Chemical Co., Rubber Service Division, Akron.
§E. I. du Pont de Nemours & Co., Inc., Rubber Chemicals Department Wilmington, Del.
¶B. F. Goodrich Chemical Co., Rose Bldg., Cleveland, O.

From stress-strain data for these compounds, the optimum cure for each was selected, and 0.5-inch slabs were vulcanized for 10 minutes more than the optimum time. Because the standard ASTM pellet, 1.129 inches in diameter, taxed the capacity of the load cell when tests were conducted on specimens aged at low temperatures, a cylindrical test specimen 0.7-inch in diameter and 0.5-inch high was used. The testing procedure consisted in placing the test pellet in the center of the lower platen and then raising it against the rigid upper platen by means of the crank and gear assembly. The sample

[1] The work reported in this paper was carried out under the sponsorship of the Office of Synthetic Rubber, Reconstruction Finance Corp., in connection with the government synthetic rubber program. This paper was presented before the Division of Rubber Chemistry, American Chemical Society, Detroit, Mich., November, 1948.
[2] Government Laboratories, University of Akron, Akron, O.
[3] Formerly with The B. F. Goodrich Co. Now with Firestone Tire & Rubber Co.
[4] S. D. Gehman, D. E. Woodford, C. S. Wilkinson, Jr., *Ind. Eng. Chem.*, 39, 1109 (1947).
[5] J. W. Liska, *Ibid.*, 36, 40 (1944).
[6] ASTM D395-46T. "ASTM Standard on Rubber Products." American Society for Testing Materials, 1916 Race St., Philadelphia, Pa.
[7] L. R. Sperberg, J. F. Svetlik, India RUBBER WORLD, May, 1951, p. 182.
[8] ASTM D395-46T. "ASTM Standards on Rubber Products."
[9] *Anal. Chem.*, 20, 713 (1948).
[10] Baldwin-Lima-Hamilton Corp., Philadelphia 42.
[11] The Foxboro Co., Foxboro, Mass.

Table 1. Stress Relaxation Data

Raw Material in Compound	Hours Condi-tioned	212° F. % of Orig-inal Load*	212° F. % Re-laxa-tion*	212° F. % Re-cov-ery†	158° F. % of Orig-inal Load*	158° F. % Re-laxa-tion*	158° F. % Re-cov-ery†	75° F. % of Orig-inal Load*	75° F. % Re-laxa-tion*	75° F. % Re-cov-ery†	Minus 20° F. % of Orig-inal Load*	Minus 20° F. % Re-laxa-tion*	Minus 20° F. % Re-cov-ery†	Minus 40° F. % of Orig-inal Load*	Minus 40° F. % Re-laxa-tion*	Minus 40° F. % Re-cov-ery†	Minus 70° F. % of Orig-inal Load*	Minus 70° F. % Re-laxa-tion*	Minus 70° F. % Re-cov-ery†
GR-S	None	78.0	22.0	63.4	88.5	11.5	76.9	87.6	12.4	74.2	100.	0	83.7	97.1	2.9	76.9	100.0	0	36.0
Polybutadiene		67.7	32.3	54.1	82.9	17.1	71.1	84.8	15.2	72.6	94.5	5.5	78.6	94.1	5.9	78.6	90.8	9.2	71.1
Natural Rubber		47.6	52.4	34.3	83.9	16.1	69.9	86.8	13.2	71.3	91.5	8.5	75.7	98.7	1.3	77.3	98.3	1.7	67.9
GR-I		61.4	38.6	50.0	87.1	12.9	75.8	94.4	5.6	83.6	96.7	3.3	83.6	100.0	0	85.9	100.0	0	73.9
GR-M		81.2	18.8	70.5	90.0	10.0	79.0	86.3	13.7	75.1	100.0	0	86.9	97.5	2.5	79.4	78.3	21.7	13.3
Hycar		69.6	30.4	56.0	85.6	14.4	70.6	84.1	15.9	66.3	87.8	12.2	76.0	97.4	2.6	48.7	85.6	14.4	3.4
GR-S	4	83.1	16.9	71.4							78.6	21.4	69.2	42.0	58.0	34.2			
Polybutadiene		82.3	17.7	68.6							79.3	20.7	67.5	78.4	21.6	65.5			
Natural rubber		59.7	40.3	46.0							81.2	18.8	65.0	75.8	24.2	60.4			
GR-I		76.8	23.2	63.5							80.6	19.4	71.1	69.4	30.6	59.4			
GR-M		83.2	16.8	72.6							83.7	16.3	73.1	54.9	45.1	41.6			
Hycar		76.1	23.9	59.8							44.1	55.9	33.8	—	—	—			
GR-S	24	92.7	7.3	81.3							75.6	24.4	65.7	56.3	43.7	47.8			
Polybutadiene		87.4	12.6	75.6							83.0	17.0	70.6	75.9	24.1	64.4			
Natural rubber		79.8	20.2	66.9							79.7	20.3	62.7	77.5	22.5	60.8			
GR-I		64.4	35.6	54.6							81.9	18.1	70.9	75.3	24.7	65.0			
GR-M		84.5	15.5	74.7							83.2	16.8	72.7	64.3	35.7	55.7			
Hycar		78.0	22.0	64.5							43.0	57.0	33.8	—	—	—			

*After 100 minutes of test.
†Fifteen minutes after aperture between platens was increased by 0.010-inch.

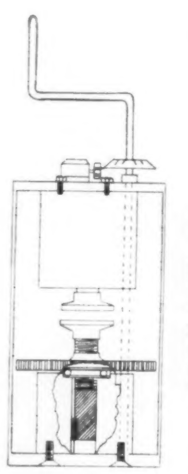


Fig. 1. Schematic Drawing of Stress Relaxation Jig

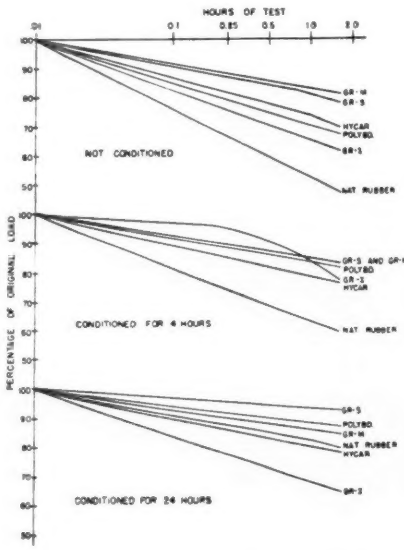


Fig. 2. Stress Relaxation Tests at 212° F.

was compressed 40%, and the force on the load cell was automatically recorded on the Foxboro Dynalog. The test specimen was permitted to relax for 100 minutes at 40% compression; then the aperture was increased by 0.005- or 0.10-inch, depending on the testing temperature. As the sample recovered from its deformation, the stress applied to the strain-gage bridge was recorded by the Dynalog. Since the initial portion of the relaxation curve is extremely steep, the method initiated by MacDonald and Ushakoff was adopted. Instead of considering the peak load as the zero relaxation point, they adopted the extrapolated stress at 0.6-minute. This extrapolation was made from a graph drawn by plotting the actual stress applied as ordinates against time on a logarithmic scale as abscissa. With this derived value as the initial stress, the relaxation at any given time may be calculated as follows:

$$\% \text{ Relaxation} = 100\% - \left\{ \frac{\text{stress at given time}}{\text{extrapolated initial stress}} \times 100 \right\}$$

Although this testing procedure was used for the majority of tests with this apparatus, preliminary experiments have been conducted with variations in the described method. Tests were conducted at 212, 158, 75, —20, —40, and —70° F. In addition, specimens were conditioned for both four and 24 hours at 212, —20, and —40° F. prior to loading.

Discussion

MacDonald and Ushakoff reported that the change in relaxation of several elastomers tested at room temperature is linear with the logarithm of time. Data obtained with the instrument developed at the Government Laboratories verified this observation when tests were conducted over a period of 100 minutes at room temperature. At 212 and —20° F. and at lower temperatures, several tests indicated that some of the elastomers exhibit a non-uniform rate of relaxation with log time. This non-uniformity is probably caused by additional vulcanization or aging of the sample at the higher temperatures and by a form of crystallization at the lower temperatures.

Table 1 presents the pertinent data obtained with the six compounds over the range of temperatures investigated. The percentage of original load and relaxation after 100 minutes of test and the subsequent recovery values are shown.

To calculate the recovery values, the load measured 15 minutes after increasing the aperture between the platens was divided by the extrapolated initial stress. The distance between platens was increased by 0.005-inch for tests conducted at —20° F. or lower and by 0.01-inch when the temperatures were 75° F. or higher.

Practically all the graphs are similar to Figure 2. The actual relaxation is the difference between the percentage of original load and 100%. For example, the GR-M (neoprene) line of the "not conditioned" sample at 100 minutes shows 81.2% of the original load or 18.8% relaxation. In contrast, natural rubber retained only 47.6% of the original load and relaxed 52.4%. The breaks in the GR-S and Hycar lines indicate changes in rate of relaxation. When specimens were conditioned for four hours previous to loading, the spread of relaxation values narrowed, and the first drastic variation from a uniform rate of relaxation was indicated by the GR-I curve. The curve obtained after conditioning the samples for 24 hours at 212° F. previous to loading indicates that the transition which caused a non-uniform rate of relaxation for GR-I was followed by a return to a uniform relaxation rate. No further tests were conducted at 212° F. after it was learned that temperatures above 150° F. may damage the bond of the strain-gage bridge. These data must therefore be classed as doubtful.

Tests at 75 and 158° F. (no graphs shown) indicate the rate of relaxation to be uniform except for slight breaks in the curves for compounds of natural rubber and GR-I after 60 minutes of test. With the possible exception of the GR-I tested at 75° F., these irregularities were of a magnitude that could fall within experimental error. MacDonald and Ushakoff did not report data for any GR-I compounds.

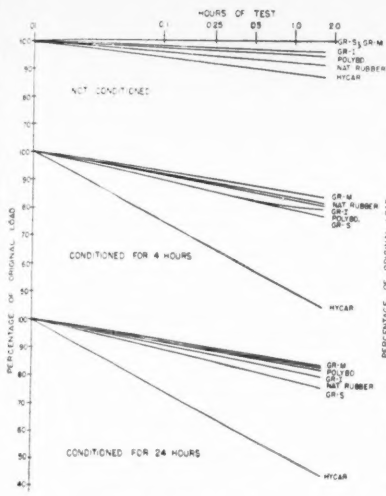


Fig. 3. Stress Relaxation Tests at —20° F.

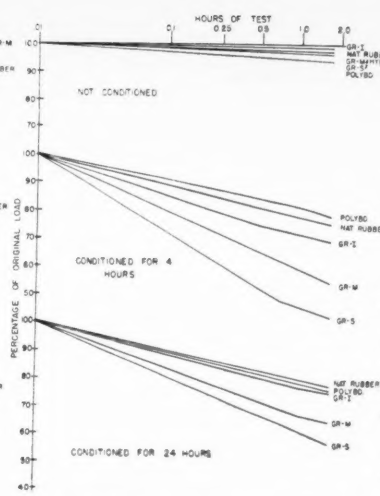
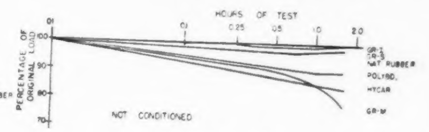


Fig. 4. Stress Relaxation Tests at —40° F.

Fig. 5. Stress Relaxation Tests at —70° F.



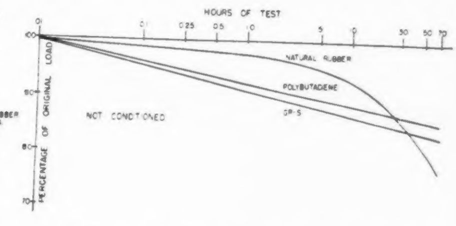


Fig. 6. Stress Relaxation Tests at —20° F.; 70-Hour Test

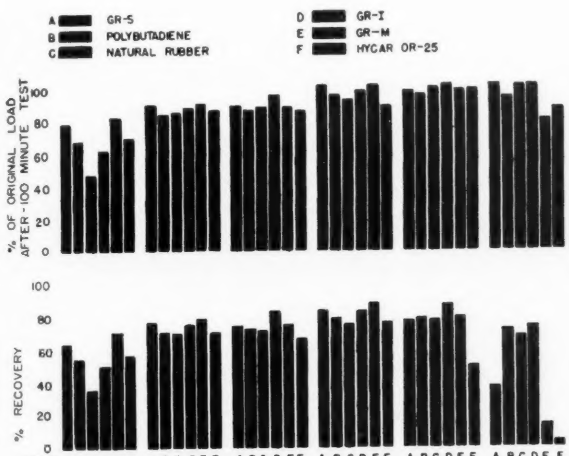


Fig. 7. Summary of Relaxation and Recovery Values Obtained for the Several Polymers

All curves in Figure 3, except that for the "four-hour conditioned" sample of polybutadiene, show uniform relaxation rates for the 100-minute test period at —20° F. After conditioning for four and for 24 hours, the specimens of the Hycar compound relaxed rapidly to 44 and 43% of the original loads, respectively.

The stress relaxation experiments at —40° F. (Figure 4) show very little change in the applied force when the samples were not conditioned previous to loading. After four hours of conditioning, the Hycar sample was too stiff to be compressed 40%, while all the other compounds showed much greater relaxation than when not conditioned. The slight breaks in these lines cannot be explained at present. The spread in percentage of original load of the five samples after 24 hours of conditioning, was considerably less than that obtained after four hours of aging. Figure 5, stress relaxation at —70° F., shows GR-M to increase in rate of relaxation approximately one-half hour after compression and indicates the possibility of crystallization. Definite irregularities may also be noted in the GR-S and natural rubber curves. Because the test specimen of GR-S, after four hours of aging at —70° F., was too stiff to be compressed 40%, no further experiments were conducted on aged samples at —70° F. Recent tests, however, have shown that after one hour of aging at —70° F., polybutadiene made at 122° F. requires a deflection of about 34% to produce a stress of 1,000 pounds per square inch, compared to 7% for natural rubber, 4% for GR-I, and 3% for GR-S.

In figure 6 a definite increase in the relaxation rate for the natural rubber compound is noted; whereas both polybutadiene and GR-S appear to relax evenly over a 70-hour period at —20° F. The discrepancy between the relaxation values of GR-S for the 100-minute test and the 70-hour test cannot be explained satisfactorily. Figure 7 presents a summary of the relaxation and recovery values obtained. At temperatures above —40° F., the recovery values (based on original load and not the relaxed load at 100 minutes) appear to parallel the percentage of original load values after the 100-minute test period. In the temperature range between 158 and —40° F., recovery values for GR-S are equal to or better than those of polybutadiene and natural rubber; whereas GR-I is superior to all the other polymer compounds over the full range of 212 to —70° F. The inferiority of the recovery properties of GR-S, GR-M, and Hycar at —70° F. is clearly indicated.

Summary and Conclusions

Primarily, the purpose of this report was to present information obtained with a newly designed instrument to be used for the determination of low-temperature characteristics of elastomers. The versatility of the instrument affords many variations from the testing procedure employed in obtaining the data reported herein.

Pressure Cell

A NEW transducer has been introduced by The Foxboro Co., Foxboro, Mass., for converting fluid pressure into proportional a.c. voltage. The Dynaformer Pressure Cell, as it is called, is intended for use with the company's Electronic Resistance Dynalog Instrument; the function of the latter is to measure the voltage resulting from the transducer in terms of pressure.

The new unit operates through a Bourdon pressure spring which, responding to fluid pressure, positions a copper ring to which it is linked. Movement of the ring, which surrounds the iron core of a differential transformer, induces a differential voltage in the output winding; such voltage is proportional to the fluid pressure. Specifications for the moisture protected pressure cell include: accuracy, within ¼% at any point; protection against overrange, to 150% of its rating; and pressure ranges available, from 0-30 inches of mercury to 0-10,000 psi.

Editorials

Rubber Industry Outlook Better Than Average for 1954?

RUBBER industry production and sales, which have been climbing more or less steadily along with those of most other industries during the post-war years, achieved new records in 1953. Sales should reach a dollar volume of $5.5 billion and new rubber consumption, which is the best overall indication of production, should establish an all-time high of 1,340,000 long tons. The year 1954 in the rubber industry is not expected to be quite so good as 1953, but a very good year is predicted. Any decline should be less than the average for all industry.

Economists, business analysts, bankers, and others concerned with forecasting future trends in business have agreed, in general, that there will be some readjustment in overall activity in 1954, but the drop will not exceed 15%. Tapering off in the rubber industry is estimated at between 5% and 7% in 1954.

One of the major factors involved in the picture for the whole country is the reduction in military and foreign aid spending by the Federal Government by about $5 billion in the fiscal year beginning July 1, 1954. Proposed tax reductions scheduled for January 1, 1954, are expected to liberate an equivalent amount of money, however, thus transferring this amount of spending from government to private auspices. Investment in new plants and equipment is estimated at about 5% to 6% less than in 1953, but the total of $26.3 billion for 1954 is still very high. In this latter category the rubber industry is planning to spend $115 million in 1954, as compared with $140 million in 1953.

The Federal Reserve Board's figures for production in several industries indicates that in October, 1953, the rubber industry was about 13% lower than at the Korean War peak. Automobiles were off 11.5%, machinery 5%, chemicals 3%, with the average decline amounting to about 6%.

The Rubber Manufacturers Association in its year-end round-up predicted that the production of rubber goods as a whole would drop no more than 5% in 1954. Although original equipment tire sales are expected to be lower, replacement sales should be higher than the 47.5 million units sold in 1953. Light mechanical goods products may drop 5% from their 1953 levels; while the production of heavy industrial rubber goods, including all types of industrial hose and power and conveyor belting, is expected to remain at or near 1953 levels. Protective rubber footwear has not had such good demand in the eastern part of the country due to mild winter weather during the past few years, but the market for rubber-soled canvas footwear has broadened to aid this branch of the industry.

More plastics raw materials were produced and sold by that industry in 1953 than in any previous year. The rubber industry, which has considerable activity and interest in plastics, is undoubtedly glad to note that the plastics industry may exceed even its 1953 record production and sales figures in 1954.

One difficulty anticipated in 1954 is that if the need of lower finished goods prices is indicated to maintain sales volume, rubber goods manufacturers will find that operating costs, particularly labor, transportation, and plant equipment, are at such high levels that selling prices cannot be reduced far without seriously affecting the profit margin.

Basic raw material prices are expected to remain relatively stable in 1954. Some increase in the price of natural rubber is likely, following the recent action of the General Services Administration in modifying its stockpile rotation procedure so that the effect on the market will not be so pronounced. In this connection, however, it is interesting to note that the President's Materials Policy Commission Report on Rubber in June, 1952, predicted at that time, as follows:

"The competition of synthetic rubber is expected to bring the long-run world price of natural rubber down to the real cost of producing synthetic rubber—that is, to perhaps 20¢ a pound in terms of 1950 dollars."

It is doubtful if the Commission expected the price of natural rubber to reach the 20¢ level quite so soon. It is not likely that the natural rubber price will stabilize at this or any other level until private industry operation of the synthetic rubber producing plants becomes a reality.

Along with stabilized prices for both natural and synthetic rubber is the need of stabilized quality and at a proper level. The RMA Crude Rubber Committee has had some success in obtaining improvement in the quality of natural rubber in the recent past. Presumably, synthetic rubber will continue to be produced with as good or better technical uniformity by private industry.

The effort started in 1949 by the natural rubber producers to provide what is termed "Technically Classified Natural Rubber" is expected to be continued and expanded for the benefit of all consumers. This effort will be in addition to the work of the RMA in bringing about closer adherence to standard samples and better packing and inspection of baled rubber.

When all factors are considered, the outlook for 1954 is for another good year for the rubber and the plastic industries. It appears that the management of both industries is justified in estimating that the readjustment in these industries will not be so much as that for the whole country. Competition will be keener, however, and more emphasis on sales, new product development, and research will be more necessary than ever before.

R. G. Seaman

DEPARTMENT OF
PLASTICS TECHNOLOGY

Biaxially Oriented Methacrylate and Polystyrene Sheet[1]

C. Paul Fortner[2]

THERE are several conceptions of what orientation of plastics by stretching does to the molecules. The most widely accepted is the idea that the completely random organization of the elongated molecules is changed such that the long axes are more inclined parallel to the directions of stretch. Other conceptions are related to the probability of changing the actual physical shape of the molecules, rather than just their position. This latter more easily explains the relaxing to original shape when an oriented piece is slowly heated with no stress, and the partial loss of orientation when an oriented piece is held immobile and heated above the original orientation temperature.

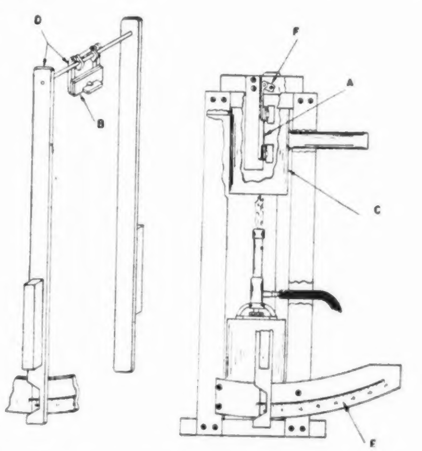


Fig. 1. Diagram of Bailey Unmolding Stress Tester, Showing (A) Specimen; (B) Clamps; (C) Oil Bath; (D) Linkage to Scale; (E) Scale; and (F) Bell Crank Arm

At any rate, if a filament or sheet of plastic is stretched in one direction under temperature conditions such that the molecules can move somewhat, but are still not free to move as in a fluid state, they tend to change in such a manner that if the plastic is cooled in that condition, the physical properties will be considerably altered. If, however, a sheet is stretched in two directions at once, or if first stretched in one direction and, while held in that condition, is then stretched in a transverse direction, still different properties result.

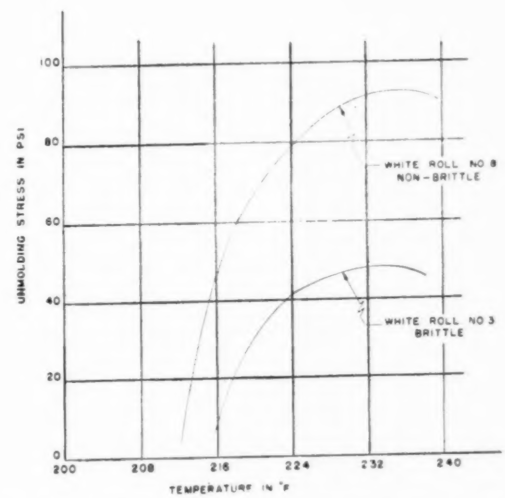


Fig. 2 Unmolding Stress *versus* Temperature Curves for Two Polyflex Oriented Polystyrene Samples; Long Axes of Both Specimens Were Taken Parallel to Direction of Orientation

Orientation Equipment

At Plax Corp., these changes in physical properties have led us to develop experimental equipment for the production of biaxially oriented sheet. As with most development work, the early machine was relatively simple in comparison to later equipment.

Attempts to produce oriented sheet continuously and in duplicatable quality indicated the necessity of more temperature controls, more speed adjustments, and sturdier machine parts for newer machines.

It is interesting, I believe, to note that temperatures are indicated or recorded at 59 places. Provision is made for control of temperature at all these points either manually by the operator or by control instruments, as well as at five places where measurement is not considered necessary.

Speed in feet or revolutions per minute is indicated at seven points and is adjustable at nine places.

Plastic pressure is indicated at two points, and equipment to measure tension in the sheet is being developed.

Nine cam adjustments can be made to adapt the stretch pattern to the peculiarities of the powder being run or to produce a sheet with particular properties.

[1] Presented before the National Technical Conference, Society of Plastics Engineers, Inc., Boston, Mass., Jan. 21, 1953.
[2] Plax Corp., P. O. Box 1019, Hartford 1, Conn.

The above indicates to some extent the degree of control necessary to compensate for variations in molding powder and to run various sheet gages. There are additional mechanical changes made before starting a machine if major gage changes are contemplated. Our present range of commercial gages is 0.003- to 0.020-inch, although some thinner materials have been produced.

To elaborate somewhat on the reason for the many temperature control points requires consideration of the fact that the stretch, to accomplish its object, must be done within a narrow temperature band. If the sheet is too cool, little stretching can occur, and sheet tearing results. If the sheet is too hot, thermal relaxation will remove the effects of orientation.

The sheet must be handled and cooled in such a manner that it is not deformed, but is cooled uniformly to stretching temperature. Edge effects of radiation, machine radiation, and transient drafts make this somewhat difficult. If there are gage variations, they affect cooling rate and, consequently, whether or not the sheet breaks or retains its orientation. Hot or cool spots in the equipment have the same effects and may, therefore, be introduced to modify gage where other corrective measures are difficult.

Control Tests

To determine if all these variables have been properly controlled, several tests have been developed. Sheet thickness, besides being measured with micrometers, is continuously indicated and recorded with a beta ray gage. Samples are periodically unmolded, as discussed in James Bailey's paper[3] before this group at Detroit in 1948. Samples are also periodically unmolded by heating progressively in an oil bath with provision for measuring the stress at unmolding temperature. This equipment, built by Mr. Bailey, is illustrated in Figure 1. As can be seen, the specimen (A) is held in clamps (B) and immersed into an oil bath (C). The temperature of this bath is increased slowly. As unmolding temperatures are reached, the sample tends to relax and shrink. Force to prevent this relaxation is supplied and indicated through the linkage (D) on the scale (E). The bell crank arm (F) was made very short to minimize the inaccuracy resulting from actual shortening of the sample.

Stress Relations

A plot of temperature *versus* stress (see Figure 2) shows that as temperature increases the stress rises to a maximum and then drops off. This maximum stress is that which was imparted to the sheet at that temperature in the machine. If this stress is too low, the sheet is brittle.

A plot of stress *versus* time at various temperatures of the bath (see Figure 3) is interesting. This shows that use of a slowly rising bath temperature will more quickly and accurately indicate maximum stress than a set temperature *versus* time test. It is also possible to show differences in polymers by the temperature rise *versus* stress method, and Figure 2 also illustrates two lots of similar polymers run under similar machine conditions, but with sufficiently different results that one made good sheet, and the other questionable.

For normal sheet usage it is desirable that the stress be about the same in both directions. Some special uses, however, require extreme toughness in one direction, even at the expense of some toughness in the other direction. This can best be achieved by varying the amount of stretch, although the temperature may be varied to affect the amount of retained orientation. In either case unmolding measures the effectiveness of the stretch as a recordable number. Table 1 gives typical transverse and longitudinal unmolding stresses for various oriented polystyrene and polymethyl methacrylate sheets.

TABLE 1. TYPICAL STRESS UNMOLDING RESULTS FOR ORIENTED SHEETS

Roll No.		Thickness, In.	Unmolding Stress, Psi. Transverse	Unmolding Stress, Psi. Longitudinal
Oriented Polystyrene (Polyflex):				
K 5	Green	0.015	95	105
J 183	Peach	0.014	95	120
J 207	Blue	0.016	115	97
R 7	Gray	0.015	85	71
BX	Trans.	0.012	32	53
#1-37	Trans.	0.003	123	71.4
#268	Trans.	0.003	103	93.8
Oriented Polymethyl Methacrylate:				
1-320		0.015	148	87.6
2-335		0.020	134	60.4
7-600		0.030	89	22
1-200		0.008	166	92

The normal test of bending a piece between thumb and forefinger quickly sorts the very brittle from the non-brittle, but does not measure the degree of differences.

Effects of Orientation

The orientation of a plastic sheet changes some of the physical properties, but not others. Table 2 gives some data comparing the properties of standard and oriented polystyrene and polymethyl methacrylate.

TABLE 2. COMPARISON OF PHYSICAL PROPERTIES OF STANDARD AND ORIENTED POLYSTYRENE AND POLYMETHYL METHACRYLATE

	Polystrene		Polymethyl Methacrylate	
	Standard	Oriented	Standard	Oriented
Tensile strength, psi.	5,000-9,000	7,000-12,000	7,500-10,000	7,000-9,000
Elongation, %	1-3.6	8-18	2-10	2.4
Strength in flexure, psi.	8,000-16,000	Over 10,000	13,000-17,000	.....
Compression strength, psi.	11,000-16,000	Over, 7,500	12,000-18,000	.....
Impact strength (Izod), Ft.-lbs./in. of notch	0.25-0.5	Over 3.0	0.4-0.5	.....
Hardness, Rockwell "M"	65-90	80-95	85-105	.....
Breaking angle, degrees bend around 1/8-in. mandrel	44	180+	78	180+

Orientation of polystyrene produces a tough sheet which does not have the brittleness of normal polystyrene or the dimensional change of plasticized sheet. Oriented polystyrene does retain the tasteless, odorless, and nontoxic properties of standard polystyrene. These improved properties plus chemical resistance are the reasons for use of the oriented material in battery binder strips, dishes, place mats, shelf covering, decorations, and toys.

Weathering Tests

An additional property which has not been fully explored is the improvement in weatherability of oriented polystyrene.

We started roof exposure testing of samples on April 26, 1951. This test is continuing, but the photograph (see Figure 4) made November 12, 1952, shows that after 18 months' exposure at Hartford, no serious degradation had been encountered. Half the samples are exposed under glass, and some are attached only at one end to allow some flapping by the wind. All are periodically examined for crazing and bent to test for brittleness.

In addition to this outdoor weathering test, we have been conducting accelerated weathering tests in the Atlas Weatherometer, where it is usually assumed that an hour is roughly equivalent to 25 hours' outdoor exposure. Some of our samples have now been exposed for 2,300

[3] "Stretch Orientation of Polystyrene and Its Interesting Results." India RUBBER WORLD, 118, 225 (May, 1948).

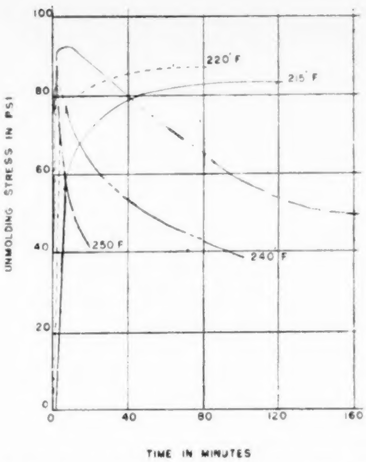


Fig. 3. Stress Relaxation Curves (Unmolding Stress versus Time) for Terra Cotta Polyflex (Roll 8) Specimens in the Longitudinal Direction; Unmolding Ratios Were 4:1 in the Longitudinal Direction and 2:1 in the Transverse Direction

hours of test, equivalent to more than six years of actual exposure, without failure.

Samples in the Weatherometer are exposed in an unstressed state as are those on the roof, but some additional tests where the samples are formed in two-, four-, and six-inch circles to induce stress other than that of orientation are also showing that biaxially oriented polystyrene sheet has much greater resistance to weathering than unoriented polystyrene.

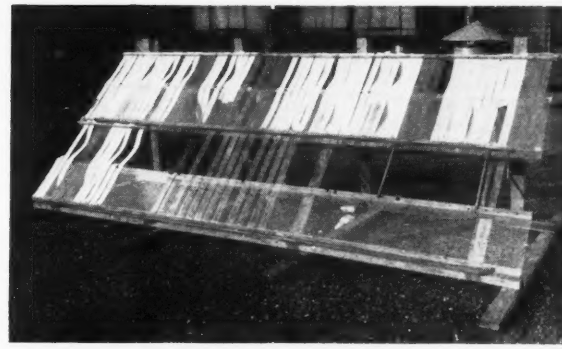


Fig. 4. Roof Exposure Tests of Oriented Polystyrene Specimens Show No Serious Degradation after 18 Months' Exposure

Weathering tests of oriented methacrylate were not started so long ago as the polystyrene, but test strips have shown no change after 674 hours in the Weatherometer.

Because of this apparent improvement in weatherability, we are selling some Polyflex where outdoor weatherability is important, as in awnings.

Summary and Conclusions

To conclude, polystyrene and polymethyl methacrylate extruded sheet has been continuously oriented in two directions, and improved toughness has resulted. One of the control tests developed is the "unmolding stress" which may be used to indicate relative toughness, but may also be used to study polymer differences and temperatures of original orientation.

Meetings and Reports

SPE Conference Program and Abstracts

DETAILS of the program and abstracts of some of the technical talks are available for the tenth annual National Technical Conference of the Society of Plastics Engineers, Inc. To be held at the Royal York Hotel, Toronto, Ont., January 27-29, the Conference will include technical sessions; the SPE annual banquet on January 28; the annual business meeting on January 29; various breakfast and luncheon meetings; the election of 1954 national officers by the national council; and a complete ladies' program. The program for the technical sessions follows:

Wednesday, January 27

The first session will be held during the afternoon, with A. E. Byrne, Canadian General Electric Co., Ltd., presiding. The first five papers comprise a symposium on **"Modified Styrenes — Developments and Applications,"** as follows: 1:45 p.m. —**"Styrene Acrylonitrile Copolymers,"** S. Whittaker, Bakelite Co.; 2:05 p.m.— **"Techniques and Applications of Modified Styrene Sheet,"** F. T. MacRae and W. D. Harris, Dow Chemical Co.; 2:25 p.m.—**"Applications for Rubber Modified Styrene Molding Compounds,"** E. B. Hellyer, Monsanto Chemical Co.; 2:45 p.m.—**"Kralastic, a Polymer of Styrene / Acrylonitrile / Butadiene, in Pipe Fittings,"** P. M. Elliott, Naugatuck Chemical Division, United States Rubber Co.; and 3:05 p.m.—**"Present and Future Applications of Heat Resistant, Modified Styrenes,"** C. J. Snyder, Koppers Co.

Following a discussion period on the symposium papers, the session will conclude with a paper at 4:00 p.m. on **"Why More Plastics?"** by A. Renfrew, Imperial Chemical Industries, Ltd.

Thursday, January 28

There will be concurrent morning technical sessions. Session "A" will have B. Kellam, Hydro Electric Power Commission of Ontario, and F. W. Reinhart, National Bureau of Standards, as moderators, and will include: 9:00 a.m.—presentation of winning papers in the 1953 SPE Prize Paper Contest; 10:30 a.m.—**"Marking and Decorating of Plastics,"** A. N. Skeels, Art Roll Leaf Stamping Co.; and 11:15 a.m.—**"Extrusion of Thermoplastic Film and Sheeting,"** G. P. Kovach, Foster Grant Co. Session "B" will consist of: 9:00 a.m.—**"The Plastics Industry Challenges Educators,"** the annual SPE educational forum under the direction of J. W. Lindau, III, Southern Plastics Co., Inc.; and 11:20 a.m.—**"Plastic Material Problems in Power Distribution,"** Mr. Kellam.

J. H. Shipley, Canadian Industries, Ltd., will preside over the afternoon session at which the following papers will be presented: 1:45 p.m.—**"Polyester Resins and Their Industrial Applications,"** I. E. Muskat, Celanese Corp. of America; 2:25 p.m.—**"Tool Steel for Plastic Molds,"** H. C. Becker, Crucible Steel Co. of America; 3:15 p.m.—**"Liquid Polymers Combined with Epoxy Resins,"** J. S. Jorczak and J. A. Belisle, Thiokol Chemical Corp.; and 3:55 p.m.—**"Arcing Tests on Plastics,"** T. J. Martin and R. L. Hauter, Boeing Airplane Co.

Friday, January 29

Concurrent morning sessions will again be held. Session "A" will include: 9:00 a.m.—**"Symposium on Extrusion,"** under the direction of G. M. Prall, Western Textile Products Co.; and 11:15 a.m.—**"Vinyl Paste Resin Dispersions—Today and Tomorrow,"** W. D. Todd, B. F. Goodrich Chemical Co. The extrusion symposium will include the following four papers: **"Dry Blending of Vinyl Compounds,"** M. S. Greenhalgh, General Electric Co.; **"Types of Extruders,"** H. O. Corbett, Auburn Button Works, Inc.; **"Take-Off and Cooling Equipment,"** speaker not announced; and **"European**

Developments in the Extrusion Industry," E. Davey-Turner, R. H. Windsor, Ltd.

Session "B" in the morning will be a research symposium presided over by Bryce Maxwell, Princeton University. The following papers will be presented: 9:05 a.m. —**"Crazing of Polystyrene,"** E. E. Ziegler, Dow Chemical; 10:00 a.m.—**"The Theory on the Changes in Physical Characteristics of Plastics Caused by Radiation,"** J. W. Ryan, G-E; 10:30 a.m —**"Properties of Multiaxially Stretched Acrylic Plastics,"** Irving Wollock, NBS; and 11:00 a.m.—**"Adiabatic Extrusion,"** J. McKelvey, E. I. du Pont de Nemours & Co., Inc.

The afternoon technical session will be presided over by E. W. Binkley, Smith & Stone, Ltd., and will consist of the following papers: 2:00 p.m.—**"The Mechanical Properties of Polyethylene,"** R. H. Carey, Bakelite; 2:40 p.m.—Report of the SPE Professional Activities Committee, L. M. Debing, Monsanto; and 3:30 p.m.— **"Cutting Costs with Quality Control,"** Dorian Shainin, Rath & Strong Co.

Abstracts of Papers

Available abstracts of the technical session papers are given below:

"Styrene/Acrylonitrile Copolymers," S. Whittaker. Styrene-acrylonitrile copolymers are rigid, transparent materials with properties substantially different from those of the monomers. The copolymers have higher mechanical strengths, better weather resistance, and different chemical properties from polystyrene. These copolymers can be molded and extruded in conventional equipment. Oriented copolymers in the form of stretched monofilaments showed the same improvement in properties as molded copolymers. Low-temperature data indicate a brittle point below —50° F. for the copolymers, which further widens their field of scope.

"Why More Plastics?" A. Renfrew. While there is an undoubted need of new plastics, the present trouble of the chemist is to imagine how these needs may be fulfilled. In addition, plastics chemists and engineers must face the challenge presented by the disadvantages of their products. The upper temperature limit at which plastics may be used is far too low, and many plastics have poor resistance to weathering. While there is no reason for pessimism, revolutionary thoughts are needed to eliminate the problems now present.

"Marking and Decorating of Plastics," A. N. Skeels. Advice will be given to mold design engineers on considerations prior to actual making of the mold to minimize decorating costs and time factors. The various methods of marking and decorating will also be covered.

"Plastic Material Problems in Power Distribution," B. Kellam. Plastics activities by the large electrical utility firms will be discussed. Special attention will be given to three phases: (1) development of a plastic cable fastener for supporting vinyl insulated control cables; (2) use of polyethylene as a wire insulation in very large electrical networks; and (3) use of plastic pipe in water lines, electrical conduits, and high-voltage power lines.

"Polyester Resins and Their Industrial Applications," I. E. Muskat. The two types of polyester resins commercially available are those in which the polymerizable groups are in the alkyl and acyl parts of the molecule, respectively. Unsaturated alkyd type resins will be discussed and demonstrated, with special attention to a new thixotropic resin of wide utility.

"Tool Steel for Plastic Molds," H. C. Becker. The quality of a molded part is no better than the quality of the mold in which it was produced; so the need of adequate information on tool steels is apparent. The production, distribution, and application of steels for molds and tools will be discussed, with emphasis on the steel maker's viewpoint.

"Dry Blending of Vinyl Compounds," M. S. Greenhalgh. Controversial techniques for extruding dry blend compounds will be discussed. The pre-extrusion mixing stage is of major importance in the processes and would be greatly simplified if an extruder could be designed with better mixing and fusing action than current machines have.

"Types of Extruders," H. O. Corbett. The various extruders available commercially will be discussed, with special attention to the comparative merits of oil heated and electrically heated machines; selecting the proper extruder drive for given conditions; and basic design in tooling an extruder.

"European Developments in the Extrusion Industry," E. Davey-Turner. While extrusion will be discussed in general terms, particular reference will be made to the advantages of multiple-screw machines as illustrated by different products. The subject of extrusion of large-size plastic pipes will also be dealt with.

Reports from SPE Sections

Injection Molding of Vinyl

A talk on "Injection Molding of Dry Blend Colored Vinyls" by R. F. Hill, Monsanto Chemical Co., featured the November 18 joint dinner-meeting of the SPE Chicago Section and SPI Midwest Chapter. Held at the Western Society of Engineers' Bldg., the meeting drew an attendance of 75 members and guests. Following Mr. Hill's talk, P. J. Underwood, SPE executive secretary, spoke briefly on the Society's activities and plans for the future.

Mr. Hill noted that prior to the development of dry blend coloring of vinyls there was not much interest in vinyl injection molding because of high precompounding costs and excessive breakdown of the resin resulting from the high temperatures during compounding and molding. The use of dry blend colored vinyl eliminates the heat history of the compounding stage.

For injection molding of dry blend vinyl, as compared to standard vinyl, the nozzle opening should be reduced (about 3/32-inch is recommended), and either a "pineapple" or 50-hole dispersion disk should be used just behind the nozzle. Standard molding machines and mold metals can be used, but the metals used in the machine cylinder must resist the hydrochloric acid liberation by decomposition of the vinyl resin.

The speaker stated that a lower cylinder temperature should be used during molding than is customary with conventional vinyls, and that molding cycles 25% faster than with polystyrene can be attained. In mold design, it has been found desirable to use pin-point gating, double gating, and round runners. Shrinkage of 1-3% may be expected in relatively spherical parts, but this shrinkage is cumulative and quite large in long pieces. Flash removal can be accomplished with scissors. Undercuts are easy to mold in vinyl parts.

Mr. Hill suggested the following formulation for injection molding: 100 parts vinyl resin; 50 parts DOP or polymeric plasticizer; 25 parts clay or calcium carbonate; five parts lead, barium, cadmium, or tin stabilizer; and one-half part stearate lubricant. Plasticizer is added to the resin at about 200° F., and mixing is done at 210-225° F. The filler is added when the mass has cooled down to about 175° F. to avoid absorption of the plasticizer by the filler. The molded parts usually have high gloss, but certain plasticizers impart higher gloss than do others.

Newark Party and Elections

The Newark Section held its annual Christmas party on December 9 at the Military Park Hotel, Newark, N. J., with some 150 members, guests, and their wives attending. The party included a dinner, an evening of dancing, the distribution of table favors through the courtesy of Dow Chemical Co., and the awarding of door prizes to everyone attending. M. A. Sanders, Bloomfield Molding Co., was in charge of arrangements for the party.

The new officers of the Section for the coming year were introduced, as follows: president, Joseph L. Bonanno, Lionel Corp.; vice president, William H. Willert, Frank W. Egan & Co.; and secretary-treasurer, Donald W. Biklen, Orangeburg Mfg. Co. Newly elected to the board of directors are: R. H. Hoehn, Mack Molding Co.; Arthur Lange, Park Plastics Co.; and W. M. Schrag, Gering Products Co. W. W. Gryce, Louis Marx Co., was appointed *SPE Journal* reporter for the coming year.

New York SPE Party

The New York Section celebrated another year of continued growth at its annual Christmas party on December 16 at the Gotham Hotel, New York, N. Y. A capacity crowd of 120 members and guests attended the gala affair, which included a cocktail hour, dinner, and an excellent entertainment program. Table favors were distributed through the courtesy of Dow Chemical Co., Dow-Corning Corp., Ferro Corp., Monsanto Chemical Co., and Rotuba Extruders. The party concluded with a drawing for about 45 contributed door prizes. Arrangements for the affair were handled, as usual, by Saul Blitz, of Tico Plastics, Inc., and outgoing president of the Section.

In a brief business session following the dinner, Mr. Blitz thanked his fellow officers and committee chairmen for their work during the past year and announced the newly elected officers and directors for the coming year, as follows: president, Harold H. Schwartz, Empire Brushes, Inc.; vice president, William Lewi, Dusal Tool & Mold Co.; secretary-treasurer, G. Palmer Humphrey, R. C. Molding, Inc.; and directors (three-year terms), Guy Martinelli, Sylvan Plastics, Inc., Irvin I. Rubin, Robinson Plastics Corp., and Carl W. Virgin, Naugatuck Chemical Division of United States Rubber Co. Following the custom of previous years, Mr. Blitz was presented with a gift in token of his efforts during his term of office. The presentation was made by Mr. Schwartz on behalf of the directors and members.

SPI Vinyl Film Program

THE new Vinyl Plastic Film Standard & Seal of Quality will be promoted through an educational program to retailers, fabricators, and processors, according to Bernard Mittman, of Elm Coated Fabrics Co. and chairman of the vinyl processors administrative committee of The Society of the Plastics Industry, Inc. This program will be carried out by Ralf Shockey & Associates, Inc., New York, N. Y., under

(*Continued on page 503*)

Scientific and Technical Activities

Akron Group and Local SPE Section Symposium on Resin-Rubber Blends

THE Akron Rubber Group and the Cleveland-Akron Section of the Society of Plastics Engineers held a joint meeting on October 23 at the Mayflower Hotel, Akron, O. The meeting was in the form of a symposium on "Rubber-Resin Blends." Moderator for the symposium was F. W. Stavely, of the Firestone Tire & Rubber Co. research laboratories. The panel of experts consisted of R. C. Bascom, B. F. Goodrich Chemical Co., who discussed phenolic resin-rubber blends; Willard de Camp Crater, Naugatuck Chemical Division, United States Rubber Co., who discussed styrene-acrylonitrile resin-rubber blends; C. R. Holt, Marbon Corp., whose topic was styrene-butadiene resin-rubber blends for rigid products; Harold S. Sell, Goodyear Tire & Rubber Co., who reviewed styrene - butadiene resin - rubber blends for non-rigid products; Walter J. Smith, Firestone, who summarized polyvinyl chloride resin-rubber blends; and A. J. Urbanic, The General Tire & Rubber Co., who discussed other resin-rubber blends, both present and future.

More than 500 members of both groups were present for the two-hour afternoon session. After presenting their papers on the general topic assigned to them, the panel members answered a number of questions previously submitted. A social hour followed the symposium, after which 650 members and guests gathered for dinner.

A door prize of $15 went to Elbert W. Shaw, B. F. Goodrich Co.; while Stavros Kyriakides, General Tire, won the $10 door prize.

The chairman of the membership committee of the Akron Group, Kenneth A. Garvick, Mansfield Tire & Rubber Co., announced the Group membership at 1,330.

The Group chairman, Roy H. Marston, Jr., Binney & Smith Co., announced the following nominating committee for the election of officers for the coming year: chairman, Larry M. Baker, General Tire; D. F. Behney, Harwick Standard Chemical Co.; and E. L. Stangor, E. I. du Pont de Nemours & Co., Inc.

The after-dinner speaker was Charles W. Garvin, president of Charles W. Garvin Co. Mr. Garvin, the unofficial raconteur of the textile industry, entertained the audience with stories and anecdotes in his characteristic style. He was introduced by William A. Karl, of Firestone.

(Because of the very considerable length of the talks and the questions and answers reported from the symposium, it will be necessary to publish this material in at least two installments, the first of which is included herewith. EDITOR.)

Blends of Styrene-Butadiene Resins with Rubbers–Rigid Compounds

C. R. Holt[1]

THE uncompounded styrene-butadiene resins are not especially useful as end-product materials. Their value is entirely in their use as compounding resins with the various rubbers, with the resin used as a modifier and reinforcing agent for the rubber, or with the rubber used in small amounts to modify the basic properties of the resin.

Properties of Blends

This latter type of compound, where the resin is 60% or more of the total resin-rubber content, is usually rigid or semi-rigid and is the kind of blend which will be discussed here.

The general characteristics of these materials include excellent impact-strength, high tensile and hardness, good electrical properties, low specific gravity, bright colors, and good low-temperature properties. Practically all machining operations, such as sawing, drilling, buffing, and sanding can be readily performed. Resistance to inorganic chemicals can normally be considered very good.

The following values are typical:

Tensile, psi.	3000–6500
Elongation, %	100–1
Shore D hardness	60–80
Impact, notched Izod, lbs./in.	100–10
Specific gravity	1.00–1.15
Flexural strength, psi.	6–12000
Heat distortion, °F.	105–175
Brittle point, °F.	–40 to –60

Since these are blends of slightly unsaturated resins and somewhat more unsaturated rubbers, they are vulcanizable and must be cured to obtain the optimum physical characteristics. Cure time and temperature are dependent upon the curing ingredients used. Uncured blends are of little practical significance. In appearance they resemble the cured compound, but do not have the tensile or flexural strength of the cured stock.

Compounding

Each compound is naturally made to fit the requirements of the particular end-use. Physical properties are controlled by the type and the amount of plasticizer and filler, the softening point of the resin, and the sulfur content.

The high-styrene resins can be plasticized with a number of types of rubber plasticizers such as certain esters, chlorinated materials, coumarone-indene resins, etc., but natural and synthetic rubbers are by far the most interesting. GR-S and the high nitrile rubbers are especially compatible; natural rubber and neoprene are also very good. GR-I (or Butyl rubber) does not seem to be compatible.

The most outstanding property of these blends is their high impact strength. Small amounts of rubber (10-20%) give excellent impact strength, with only minor sacrifices in hardness and other properties. Increasing the elastomer content continues to increase impact resistance, but gradually lowers hardness, tensile, and modulus to the point of a leather-like rather than rigid compound.

The nature of the rubber used should be considered for several reasons; the low-temperature brittle point of the vulcanized blend seems to be dependent upon the freeze point of the rubber and is apparently independent of the amount of rubber present.

Polybutadiene is an excellent plasticizing rubber for good low-temperature properties although natural rubber and GR-S will give brittle points of —40 to —60° F. Stocks designed for oil-resistance would naturally call for neoprene or nitrile types as the modifying rubber. Electrical molding compounds would call for the proper grade of GR-S or natural rubber in order to maintain the excellent electrical properties of the styrene-butadiene resin.

Reinforcing pigments, such as the carbon blacks, are not generally used although up to 75 parts of an SRF or furnace black will improve tensile and compressive-strength properties.

Non-black fillers do not reinforce these blends and should be used only for cost reduction or processing advantages. For removal of a piece from a hot mold, for example, some loading is advisable to reduce shrinkage and to facilitate handling. Cotton or cellulose flock, long-fiber asbestos, and wood-flour are good in this respect. Diatomaceous silica is excellent for loading compounds designed for chemical resistance. For reducing cost, whiting and clay or the soft blacks may be used. Practical rigid compounds with an Izod impact value of nearly one pound may contain as much as 200 parts of clay on a 50-50 blend of resin and rubber.

None of these compounds has a sharp melting point. They will soften to a plastic condition at temperatures of 130-200° F., depending upon the softening point of the resin and the sulfur content of the blend. Increasing sulfur up to 12-15 parts will increase the hardness and the heat-distortion temperature at the expense of impact strength and darker color. Of two stocks equal in hardness and modulus, the one higher in resin and lower in sulfur will usually have the higher impact strength.

[1] Marbon Corp., Gary, Ind.

A similar use of high sulfur with blends of styrene-butadiene resins and rubbers is in the compounding of ebonite or hard rubber. Replacement of part of the rubber with the resin permits the use of less sulfur with consequent lighter color, reduced cure time, and increased impact resistance and softening point. Thick sections can be cured in less time without porosity or blowing.

It has been mentioned that vulcanization is necessary to bring out the full properties of these blends, but there are several exceptions to this—combinations of styrene butadiene resin and Neoprene S are very tough and will show tensiles as high as 4,000 psi. in the uncured state. Another modified high-styrene resin with a high softening point is very compatible with the various synthetic rubbers, and uncured blends show excellent impact-strength values with high heat-distortion temperatures and low brittle points.

Mixing and Processing

The mixing and processing of these blends is much the same as that of conventional curing compounds, and any conventional rubber equipment can be used. Average mixing temperature will be 200-225° F. to permit softening and fluxing of the resin with the rubber. One special precaution must be taken in the handling of the mixed compound—the uncured stock is usually very hard or even brittle, and preheating of the stock blanks before molding is necessary in most cases. A satisfactory method for curing in positive or semi-positive molds is to granulate the uncured stock and load the mold with a weighed charge of granules.

For calendering sheet blanks, the raw stock can be preheated prior to placing it on the warmer mill, or the granulated compound can be charged directly on to the warmer. The calendered stock is then usually plied up in the mold and press polished into sheets for post-forming.

As mentioned, cured compounds are very flexible, when hot, and must be cooled before they can be handled. Larger pieces are best cooled on forms which allow dimensions to be maintained accurately. Smaller articles can simply be air or water cooled. Some types of molded items can be cured flat and later reheated and shaped over forms. A cured resin-rubber blend is too thermoelastic, however, to be remolded into an entirely different shape where the stock must flow in the mold.

Applications

Typical applications for these blends include athletic and crash helmets which give protection to the wearer, are light in weight and colorful, and do not absorb moisture. Desk pads and automotive door pads can be made scratch resistant and in bright colors. Shipping containers for pharmaceuticals are strong and light; pipe fittings, acid containers, and vent ducts all illustrate the good chemicals resistance to these cured blends.

An appropriate balance of rubber, sulfur, and filler content can usually be made to meet most hardness, impact, cost, heat distortion, and processing requirements.

Questions and Answers

Q. What are the aging characteristics of the styrene-butadiene resin and rubber blends? Is surface crazing a problem with rubber-resin blends?

A. Cured blends of high-styrene resin and rubber can usually be considered to have very good aging properties. Normally the rubber is replaced with the resin, and since the resin, because of its lower unsaturation, has very good aging properties in its own right, the overall aging characteristics of the blend are improved.

Uncured blends on the other hand must be well protected with antioxidant and anti-checking wax. These blends tend to craze and veneer on weather aging especially.

Q. Can good color stability be obtained in rubber-resin blends?

A. In the high-styrene resin-rubber blends, color stability is usually no problem. The major factor, as in straight rubber compounding, is the discoloring effect of the antioxidant, and blends containing the best of the non-discoloring antioxidants are very resistant to light discoloration. The tendency of a blend to discolor from other causes depends on the overall compounding of the material.

Q. Comparing equal parts by weight, what resin is the most effective for blending with natural rubber to give a "hard rubber" stock?

A. The most suitable resins for hardening rubber compounds are the high-styrene types because of their lower specific gravity and their compatibility with natural rubber. Cyclized rubber would very probably give about the same results as the high-styrene resins.

Q. Durez 13355 disperses very easily and does a good job hardening GR-S with good retention of elongation and tensile in black stocks. Do you feel that high-styrene resins can do the same or better without increasing price of stock? Any other comments?

A. It has been our experience that high-styrene resins give higher tensile and modulus in GR-S stocks at about the same hardness and elongation. On a pound-volume basis, the Durez resin is slightly less expensive; so on an efficiency basis I am sure that a high-styrene resin will do everything that the other material will. It is difficult to make a blanket statement—each type of material has its own advantages and disadvantages, and the choice is usually dictated by the end-use of each particular compound.

Q. What additional power requirements are needed to warm up resin-rubber blends over straight rubber compounds?

A. With rubber-high-styrene resin blends, the difference in peak load for a Shore A 90-95 stock might be 20% over the same compound not containing the resin. The rubber compound, when cured, would, of course, not have the same hardness or modulus as the resin compound. In the comparing of two stocks of equal hardness and stiffness, one reinforced with resin, and the other loaded with fillers, the peak power demand of both is fairly close. As the resin-reinforced compound warms up, however, the power demand falls off because of the plasticizing effect of the resin. The loaded stock, on the other hand, shows only a slight drop in power demand.

Q. Please discuss the hysteresis characteristics of rubber-resin blends in comparison to *Hevea* and GR-S.

A. It is assumed that blends of a somewhat rubbery or resilient nature are meant. Practically all rubber-resin blends are characterized by high hardness and modulus, and any deforming force must be of a fairly high order. Reinforcing resins can be considered more plastic than elastic and, when deformed, tend to hold the deformed shape. Consequently a blend high in resin content, when subjected to a large force, will take a permanent set. In short, hysteresis is high. In considering high-styrene resins, for example, against phenolics, the former vulcanize to a thermoelastic condition; whereas the thermosetting phenolics are completely rigid at all temperatures. A vulcanized blend of high-styrene resin and rubber starts out initially with high hysteresis. As the compound-temperature increases, the hardness and the modulus decrease, and the hysteresis characteristics improve. In other words, the resin phase "unfreezes" and allows the more elastic rubber phase to become more evident. It is extremely rare that a resin-reinforced compound will be considered for a dynamic application.

Blends of Styrene-Butadiene Resins with Rubbers—Non-Rigid Compounds

Harold S. Sell[1]

STYRENE - BUTADIENE copolymer resins have gained widespread acceptance as a rubber compounding ingredient since their first introduction to the trade following World War II. These copolymer resins, containing 80 to 90% styrene in combination with butadiene, are hard, clear, brittle resins and of very limited value as resins themselves. They are, however, compatible with natural rubber, GR-S, and nitrile rubbers and impart desirable properties to be enumerated later in the discussion. These resins, moreover, are of limited compatibility and use with chloroprene rubbers and are incompatible with the butyl rubbers.

[1]Goodyear Tire & Rubber Co., Akron.

Properties of Blends

The properties imparted by the incorporation of high-styrene copolymer resin into rubber follow: (1) they increase hardness; (2) they increase stiffness; (3) they improve the poor gum properties of synthetic polymers, specifically tensile strength, elongation, and tear strength; (4) they improve abrasion resistance; (5) they promote good hot tear strength; (6) they improve the electrical properties of any rubber into which they are incorporated; (7) they do not materially alter the brittle point of the rubber into which they are incorporated; (8) they are excellent aging materials, and their incorporation improves the aging of natural rubber.

In addition to the improvements in physical properties, these resins serve several other useful functions in the compound. Among these are: (1) they are the lowest specific gravity, non-discoloring, and non-staining reinforcing material available; (2) they kill the nerve and reduce the shrinkage of the batch; (3) they act as plasticizers and processing aids at stock processing temperatures.

Mixing and Processing

Incorporation of the resins into the rubber batch is readily accomplished on conventional rubber equipment. Commercial resins have been developed which disperse upon direct addition in the Banbury or when incorporated directly into the stock on warm mill. In most cases the resin will disperse while the pigment is being incorporated into the batch. In some cases where short, cool mixing cycles are desired, some manufacturers find it desirable to premasterbatch the resin and rubber on hot equipment and use the masterbatch form on cold mill.

Applications

All existing applications for high-styrene reinforcing resins are based upon one or more of the features imparted by the resin, as outlined earlier. A few examples will serve to illustrate this point.

Synthetic leather-type shoe soles consume the greatest volume of resin and utilize the largest number of features imported by the resin. Their high hardness, while maintaining light color and low specific gravity, the stiff "leather-like" feel, the high tear, the good abrasion resistance of the soles, and the easy processing characteristics of the stock are all obtainable by resin reinforcement.

The ***wire and cable industry*** uses the resin for its excellent electrical properties, GR-S reinforcement, and aid in rapid, smooth extrusions.

Flooring manufacturers utilize the resin to maintain a high level of hardness, aid processing of the highly loaded stocks, and maintain hot tear to minimize tearing upon stripping from the mold.

Manufacturers of *molded items* use the resin for a variety of reasons such as its ability during processing and extruding of preforms and to improve tear strength and control specific gravity.

Recent work indicates that improved ***hard rubber*** can be made by obtaining some of the hardness and stiffness from high-styrene resin either at the same or reduced sulfur levels. The resin addition, because of the dilution effect and the inherent unsaturation of the resin, has a tremendous suppressing effect on the exothermic sulfur reaction.

High-styrene resin can be used as a partial substitution for balata in many applications such as *golf ball covers.*

There is evidence that high-styrene resin assists in obtaining uniformity of blow in such articles as *internally blown sponge or soling.*

Applications for the resins in the flexible stock field have grown steadily as new ways have been found to utilize the unique properties imparted by resin reinforcement. Their properties challenge you to investigate their use in your products.

Questions and Answers

Q. How does high-styrene resin reinforcement compare with reinforcement with carbon black?

A. High-styrene resin reinforcement compares most favorably with the SRF-type black so far as hardness is concerned. In GR-S, both improve tensile and tear strength, but carbon black gives better resilience. High-styrene resin cannot compete with carbon black on a straight reinforcement basis, but it can be used to augment carbon black where easier processing and flow are desired. High-styrene resin reinforcement is generally used in non-black compounds.

Q. Should accelerators and age resisters be used in rubber-resin blends? If used, what types are most satisfactory?

A. Many of the rubber-resin blends are recommended for use uncured and, consequently, do not require acceleration. The styrene-butadiene resin type, however, is generally used vulcanized, and because of their similarity to GR-S in composition, the normal GR-S type accelerations are applicable. It must be kept in mind that these resins contain unsaturation from the butadiene, which must be compensated for in the acceleration of the compound. Most commercially available styrene-butadiene reinforcing resins can be treated as containing about 20% the unsaturation of regular GR-S.

Most commercial resins and rubbers contain antioxidants to protect them during the drying operations, which may be adequate to protect the rubber-resin blend. The need of additional antioxidant and the type to be used will largely depend upon the service the blend will be subjected to and the color of the finished article. In general, it is the rubber component which must be protected, and to answer the question without going into the details of all the different types of antioxidants, I would suggest that antioxidants used to protect rubber under the various service conditions be used as a guide in protecting the resin-rubber blends.

Q. Is it necessary to adjust cures in resin reinforced stocks due to the unsaturated butadiene portion of the resin? If so, how much?

A. If any quantity of styrene-butadiene resin is used, the unsaturation of the resin must be compensated for in the compound. As stated in an earlier question, commercial high-styrene reinforcing resins have about 20% the unsaturation of an equal quantity of GR-S.

Q. What, if any, is the difference in the final product between adding a resin to the rubber or *vice versa?* What is the reason for this difference (if any)?

A. Holt. In the case of high-styrene resins, we see very little difference. In adding a rubber to the resin, the procedure is substantially longer, and the rubber has a greater chance of being overmilled, with the possibility of lowered modulus and hardness. The difference, however, can normally be considered minor.

A. Sell. So far as the high-styrene reinforcing resins are concerned, we have found no difference in the physical character of the batch or its physical properties, provided the mixing is carried to complete dispersion. There is a danger in admixing the resin into the rubber of stopping short of complete dispersion, in which case the hardness and stiffness are obtained, but the flexural properties are reduced. This point is particularly true of resin reinforced shoe soles where flex life suffers markedly. This danger is not present in admixing the rubber into the resin because too rapid addition of the rubber to the resin will chill the batch and crumble it from the mill before poor dispersion can result. I would suggest to the questioner, if he is mixing resin into rubber and has some question about ultimate dispersion, that he sample a batch at different times of mixing and prepare test sheets. He will find that at some point in the milling the properties will attain fairly constant values. This is his optimum milling time.

Q. Are any limitations on usage imposed by the thermoplastic nature of the resins?

A. These blends cannot be used at temperatures above the softening point of the blend without serious distortion of the part. This point is true regardless of whether the blend is vulcanized or unvulcanized.

It should be recognized that while the thermoplasticity is treated as a limitation and disadvantage in the above instance, it is the basis upon which the rapidly growing post-forming type of operation is built.

Q. What types of mold lubricants are most effective for resin-GR-S blends?

A. The addition of resin to rubber, particularly in the curing type formulations, aids the release from the mold. If a release agent is required, the silicone types have been found very effective, giving numerous heats without repeated application. One precaution: use it sparingly in each application.

(To be continued)

Rubber & Plastics Division, ASME, Holds Interesting Meeting in New York

THE Rubber & Plastics Division of the American Society of Mechanical Engineers held a two-day meeting in New York, N. Y., at the Hotel Statler on November 30 and December 1, as a part of the annual meeting of the parent Society. Four half-day technical sessions included two on rubber and two on plastics, and between 80 and 100 members and guests heard a variety of interesting papers.

A luncheon-meeting of the executive, advisory, and general committees of the Division was held December 1. M. E. Lerner, *Rubber Age*, retiring chairman, presided and after reporting on the progress of the Division during 1953 introduced the incoming chairman, Allen Gifford, Lord Mfg. Co. R. W. Barber, Panelyte Division, St. Regis Paper Co., was elected to the executive committee of the Division for a five-year term.

Technical Session 1

The chairman for the first technical session was S. W. McCune, III, E. I. du Pont de Nemours & Co., Inc., and the vice chairman was James B. Johnson, Linear, Inc.

"Synthetic Rubber Protects the Navy's Propeller Shafts," was the title of the first paper by E. A. Bukzin of the Navy Department's Bureau of Ships, Washington, D. C. Mr. Bukzin reviewed the use of rubber to protect the propeller shafts of ships which began after the first World War and became rather general in 1939. Synthetic rubber replaced natural rubber during World War II. Vulcanized rubber coverings, especially on high-speed combat ships, however, failed prematurely in many instances owing to the difficulty of applying the covering and the enormous amount of power applied to the shafts of some of these ships.

In recent years brush-on neoprene rubber and flame-sprayed Thiokol rubber shaft coatings have been used in place of the sheet rubber covering. The latest method

uses a superior neoprene cement to adhere vulcanized rubber sheet to the metal shaft. This last method seems most satisfactory, but requires confirming service life tests.

"The Latexing and Hot Stretching of Tire Cord, with Special Emphasis on Nylon," by C. A. Litzler, C. A. Litzler Co., Inc., was the second paper and was a relatively complete study of the tension drying and hot stretching of rayon and nylon tire cords. The improvements in the cord characteristics from the raw cord through to the completely latexed cord were discussed.

The effects of the various types of latices used were explained, and the tension drying and hot stretching operation was described in some detail. Also, the relations of the processing of hygroscopic and hydrophobic materials were outlined, and broad specifications for drying times, temperatures, and tensions were described.

Differences in the properties of rayon, nylon, Perlon, and other synthetic fibers for tire fabrics were discussed, and because of the present interest in the hot stretching of nylon tire cord the improvements in its characteristics by virtue of this treatment were enumerated.

Advanced methods of heating utilizing radiant energy or convection energy were discussed, and the establishment of the proper procedure for correlating heating, time, stretching, and tension was described.

The paper included a review of the use trends of rayon, cotton, and nylon from 1937 to a condition estimated for 1955. Also indicated was the relation of tire production to population trends. This trend predicts a major increase in productive capacity for the tension drying and hot stretching of tire cord materials.

"Modern Rubber Calendering Equipment," by Norman J. Elder, Adamson United Co., was the third and final paper of the first session. The recent introduction of modern precision calendering equipment to the rubber industry, with particular reference to the four-roll Z-type and improved three-roll types, was discussed. Some details of temperature control systems, roll crossing equipment, drilled rolls, gaging equipment, etc., were explained. This new equipment is of particular value for high-speed production, especially in the double-coating of tire cord. There is also considerable interest in three-roll universal calenders, incorporating roll crossing, drilled rolls, and other features available on the precision Z-type unit. Some companies prefer to use two of these three-roll calenders for the double-coating of tire cord instead of one Z-type calender. In this connection, a 120-degree, three-roll calender is being built to provide for easier feed.

Technical Session 2

The chairman for the second technical session on the afternoon of November 30, was P. D. Brass, United States Rubber Co., and the vice chairman was H. W. Greenup, Pilgrim Latex Thread Co.

"Dynamic Characteristics of Silicone Rubber," by G. W. Painter, Lord Mfg., was the fourth paper on the program. In spite of the desirable high- and low-temperature properties of silicone rubber, it cannot be substituted directly for natural rubber and neoprene in established designs of vibration isolators, it was said. The dynamic properties of silicone rubber were investigated with a dynamic modulus testing machine having considerable flexibility and high efficiency of operation. Comparisons between the visco-elastic properties of silicone rubber and natural rubber were made at various conditions of strain, temperature, and frequency. Although the

Allen G. Gifford

modulus of silicone rubber is affected considerably more by static strain than is natural rubber, provision for this characteristic can be made in design.

"Mechanical Properties of Polysulfide Rubbers," by Joseph S. Jorczak, Thiokol Corp., was the fifth paper presented. Polysulfide rubbers are manufactured today in the form of crude synthetic rubbers, water dispersions, and liquid polymers. The cured polymers are noted for their remarkable resistance to swell in ketones, acetate esters, gasoline and aromatic fuel blends, and for their resistance to absorption and breakdown by oxygen and ozone. The mechanical properties of these polymers present some disadvantages to universal application since they display poor resistance to deformation under load, especially at elevated temperatures, have low tensile strength, and only moderate abrasion resistance. In most applications, however, the mechanical properties are well within critical design limits.

The polysulfide water dispersions are used to flexibilize vinyl coatings, where the polysulfide polymer particles are distributed as non-extractable agglomerates throughout the coating. Tough, abrasion and erosion resistant coatings for propellers and leading edges of aircraft and for protective paints in chemical plants are obtained.

Polysulfide liquid polymers are converted at ambient temperatures to rubber having the same general properties as other polysulfide polymers. Major applications are in adhesives and sealers. Recently the reactivity of the liquid polymer with epoxy resins has opened up new fields in the adhesives, potting, and coatings fields.

The many new applications of the liquid polymers on shipboard, in aircraft, and in the electrical and electronics industry were described.

"The Versatility of Cellular Rubber in Engineering," by G. R. Sprague, J. J. Corrigan, and A. F. Sereque, all of Sponge Rubber Products Co., the sixth paper presented, described the different types and grades of cellular rubber and the method of specifying them devloped by the American Society for Testing Materials. The essential properties were described in addition to the effects of temperature and common solvents on these properties. Cellular rubber, of which there are four types, sponge, foam, expanded, and ebonite, or hard cellular rubber, is made in an infinite variety of molded and die-cut shapes, flat sheets, rods, and tubes in almost any wanted degree of firmness, with either open or closed cells. Cellular rubber is a versatile material for engineers, but it is best to examine closely the ASTM tables for it and order by their numbers and suffix letters. If the properties desired are not found, manufacturers of cellular rubber quite often can adapt a compound to fit particular leads.

"Engineering Developments of Rubber, July, 1952-June, 1953," by Betty Jo Clinebell, Rubber Division, A. C. S., Library, University of Akron, was the seventh paper offered. This annual literature review with 114 references covered such subjects as LTP GR-S; the polyester rubber, Vullcollan; thermoplastic hydrogenated polymers; hard rubber; reclaimed rubber; tires; mechanical goods; coatings; testing; etc., with special reference to those articles of interest to the mechanical engineer.

Technical Session 3

The chairman for the third techincal session was Prof. R. K. Witt, Johns Hopkins University, and the vice chairman was A. C. Webber, of E. I. du Pont de Nemours & Co., Inc.

"Viscoelasticity of Polymethyl Methacrylate—An Experimental and Analytical Study," G. H. Dietz and J. K. Knowles, Massachusetts Institute of Technology, was the eighth paper. It was part of the research on plastics being sponsored by the plastics division of the Manufacturing Chemists' Association. This paper concerned itself (*a*) with a presentation of static tensile stress-strain data under many different experimental conditions on several types of methyl methacrylate, together with an empirical equation to describe them, and (*b*) with an attempt to correlate the static behavioral characteristics of two varieties of methacrylate by means of an extension of the Boltzmann-Volterra theory of the elastic after-effect to an extent that facilitates the prediction of creep and constant strain-rate curves from stress-relaxation data to within an error acceptable for engineering purposes.

"Reinforced Plastics Laminates for Aircraft Use," by Dominick Rosato, Wright Air Development Center, Wright-Patterson Air Force Base, was the ninth paper. A description of reinforced plastic laminates used in aircraft and some of the problems of their use was the purpose of this paper.

Technical Session 4

The chairman for the fourth and final session was C. H. Adams, Monsanto Chemical Co., and the vice chairman was Norman A. Skow, Synthane Corp.

"Speedylectric; The Electrode Boiler—A New Method of Supplying Heat to Calenders and Platens," by Bradley C. Higgins, Livingstone Engineering Co., was the tenth paper. Electrode boilers generate steam by using the water between solid rod electrodes as the resistance element. The low water hazard is eliminated because when there is no water to make contact between the electrodes, no current can pass, and no steam is generated. Also, pressure control is obtained by making the pressure itself regulate the extent of immersion of the electrodes, and resistance will change in proportion to the heat load on the boiler. The boiler has two tanks; one houses the electrodes, and the other is a surge tank. Steam generated in the electrode tank flows to the load and through the regulating valve to the surge tank. As long as the steam pressure is equal in the two tanks, the water level remains the same. When the steam reaches the predetermined pressure the regulator valve shuts off the steam supply in the surge

tank. Steam generation continues in the electrode tank, producing a higher pressure in that tank which forces the water level in the surge tank to rise, and the level in the electrode tank to fall, thus uncovering the electrodes and reducing the amount of steam generated.

The company has also developed a boiler using ethylene glycols for higher temperatures.

Applications for plastics molding, laminating, tire recapping, and rubber molding are extensive.

"New Developments in Liquid Heating of Plastics Processing Machinery," by Paul L. Geiringer and Floyd Hasselriis, of American Hydrotherm Corp., was the next paper on the program. The application of high-temperature liquids to the special heating and cooling requirements of plastics processing machinery was discussed with special reference to temperature control. Liquid heat carriers with recommended operating temperatures from 400 to 1,000° F. were mentioned, and details of installations for calenders, extruders, presses, and injection molding machines were described.

"Selected Plastics References for the Mechanical Engineer, 1952-53," by P. O. Powers, F. W. Elliott, J. K. Stevenson, K. E. Jackson, and J. R. Kelly, all of Pennsylvania Industrial Chemical Corp., was the final paper on the program. This annual literature review covered materials, with special reference to vinyl and fluorine plastics; properties of various plastics materials; fabrication; and applications. Particular mention was made of papers on extrusion, injection molding, and coatings.

SORG Election Results

THE newly elected officers of the Southern Ohio Rubber Group have been announced as follows: chairman, F. Newton, Dayton Rubber Co.; treasurer, C. A. Griep, Dayton Rubber; secretary, R. J. Hoskin, Inland Mfg. Division, General Motors Corp.; and directors, H. E. Wening, R. S. Radow, and R. M. Marston, the last named affiliated with Binney & Smith Co.

Tentative plans for the spring technical meeting of the Group on March 25 call for a symposium on synthetic rubber polymerization, with representatives from each of the large synthetic manufacturing plants describing the operation performed at their respective installations.

The seventh annual winter meeting-Christmas party of SORG, held December 12 in Dayton, featured a sumptuous dinner, entertainment, and dancing at the Miami Valley Golf Club. Some 37 members and guests were chosen from the audience of 125 to receive door prizes.

Rubber Division April Meeting

IN A letter to the members early in January, the secretary of the Division of Rubber Chemistry, American Chemical Society, Arthur M. Neal, E. I. du Pont de Nemours & Co., Inc., P. O. Box 406, Wilmington, Del., called attention to the spring meeting to be held at the Brown Hotel, Louisville, Ky., April 14-16.

The chairman of the local committee on arrangements for this meeting is F. C. Wagner, also of du Pont, P. O. Box 1378, Louisville 1, Ky.

There will be a luncheon meeting of the Division's 25-Year Club on April 14, and chairman for this event is A. Brandt, B. F. Goodrich Chemical Co., Rose Bldg., Cleveland, O.

The first technical session will begin at 2:00 p.m., April 14, with Division Chairman James C. Walton, Boston Woven Hose & Rubber Co., Cambridge, Mass., presiding. There will be the usual Division banquet on the evening of Thursday, April 15.

The papers committee would like *by February 26* abstracts of 200 words, in triplicate, for papers to be presented at this meeting. The papers must show where the work was done, and a statement is required as to the amount of time needed for presentation. The author or one of the co-authors must be a member of the A. C. S. At the time of the meeting three copies of the finished paper must be available for the Division secretary.

Hotel reservation cards will be sent to the members by the local committee on or about the first of March.

Adams Replaces Goggin on IRW Board

C. H. ADAMS, group leader in the research department, plastics division, Monsanto Chemical Co., joined the Editorial Advisory Board of India RUBBER WORLD on January 1, replacing W. C. Goggin, Dow Chemical Co., who resigned as of that date.

Mr. Adams received his bachelor's degree in chemical engineering from the University of Illinois in 1939, and a master's degree from the same university in 1945. He was employed by Jos. E. Seagram & Sons in 1939 and 1940 and was with the American Plastics Corp. in 1940 and 1941. From 1941 through 1945 he was a group leader for a project of the Office of Scientific Research & Development at the University of Illinois. Mr. Adams joined the plastics division of Monsanto in 1945. He is the author of several papers on the properties and testing of plastics.

The new Board member belongs to the American Society for Testing Materials, where he is active on the D-20 Plastics Committee, and also to the American Institute of Chemical Engineers.

C. H. Adams

Fowler Discusses Latex

THE regular fall meeting of the Connecticut Rubber Group, held November 18 in Naugatuck, Conn., featured an address by Donald Fowler, of Naugatuck Chemical Division, United States Rubber Co., followed by a buffet dinner and refreshments.

The audience of some 180 persons heard Mr. Fowler speak on the "Practical Applications of Latex," an overall review of the types of latices commercially or potentially available. The influence on colloidal properties of latices and on physical properties of polymers by factors, such as monomer selection, type of polymerization, emulsifier system, and particle size were discussed, and the results of these properties on consumer articles and on other processes were covered. A number of current processes involving latex uses were described and illustrated with samples of the finished products.

Reclaim Discussed at Quebec

THE dinner-meeting of the Quebec Rubber & Plastics Group, held on November 19 in Quebec, P.Q., Canada, heard a talk by D. S. le Beau, director of research for Midwest Rubber Reclaiming Co. on "Reclaim and Reclaiming Processes as Part of the Development of the Rubber Industry."

The opening remarks of the speaker covered the sources of natural synthetic, and reclaimed rubber. Dr. le Beau then reviewed the theoretical aspects of reclaiming and discussed some of the most recent methods of production. A color film which detailed the production process employed at Midwest completed the address.

Group Program Service

THE Liaison Committee of the Division of Rubber Chemistry, American Chemical Society, will be composed of the same members for 1954 as served in 1953 and will attempt to continue the program service of the past year. This service involves approaching speakers who have addressed local Groups, with the suggestion that they present the same paper to other Groups, publishing this information if the invitation is accepted, and acting in general like a clearing house for papers proposed for presentation by suppliers to the rubber industry.

Composition of the Liaison Committee is as follows: Los Angeles-San Francisco Area, R. E. Hutchinson, Firestone Tire & Rubber Co.; Chicago-Fort Wayne, D. Reahard, The General Tire & Rubber Co.; South Ohio-Detroit-Akron-Buffalo, S. L. Brams, Dayton Chemical Products Laboratories; Washington-Philadelphia-New York, J. S. Jorczak, Thiokol Chemical Corp.; and Connecticut-Rhode Island-Boston, L. L. Longworth.

The most recent result of the work of this Committee has been the announcement concerning the availability of a speech and movie on "Statistical Quality Control" by S. Collier, Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y. Any Groups wishing to schedule this address[1] should contact Mr. Collier who will arrange to handle the requests if he is not available.

[1]For a report on this address before the New York Group, see our Nov., 1953, issue, p. 226.

Third Rubber Technology Conference

THE program of the third Rubber Technology Conference, to be held in London, England, by the Institution of the Rubber Industry on June 22-25, 1954, has been announced. Forty papers, grouped into six headings according to the problem or subject with which they deal will be presented as follows:

Properties of Natural Rubber Latex (seven papers) will consist of a description of recent research work done in this respect, with particular reference to problems associated with the earlier stages of the production of natural rubber in the Far East. Authors of the papers are T. S. Roberts, British Rubber Producers Research Association; E. W. Madge, J. L. M. Newnham, and H. M. Collier, all of Dunlop Research Centre; R. Freeman, J. E. Morris, and R. H. Smith, all of Rubber Research Institute of Malaya; M. Van den Tempel, Rubber Stichting; and W. L. Rosing, Indonesian Rubber Research Institute.

Production and Evaluation of Synthetic Rubber (six papers) covers the properties and production methods, including some new processes, for synthetic rubbers. Authors include W. Cooper, T. B. Bird, and E. Catterall, Dunlop; A. A. Morton, Massachusetts Institute of Technology; I. D. Patterson, Goodyear Tire & Rubber Co.; W. B. Reynolds, J. E. Pritchard, and J. F. Svetlik, Phillips Petroleum Co.; B. Sarno, Liljeholmens Kabelfabrik; and R. B. MacFarlane and L. A. McLeod, Polymer Corp., Ltd.

Chemistry of Rubbers (seven papers) deals with new knowledge of the structure of rubber (mostly natural rubber) resulting from latest developments. Authors include M. Gordon and J. S. Taylor, Royal Technical College, Glasgow; R. L. Stafford, Imperial Chemical Industries, Ltd.; W. H. T. Davison and G. R. Bates, Dunlop; G. F. Bloomfield, F. M. Merrett, L. Bateman, R. W. Glazebrook, C. G. Moore, and R. W. Saville, all of BRPRA; S. Baxter, P. D. Potts, H. A. Vodden, and H. W. Robinson, all of Monsanto Chemicals, Ltd.

Physics of Rubbers and Fibers (eight papers) treats of the properties of rubber and of the various natural and synthetic fibers used in conjunction with rubber. Authors of the material to be presented are from Research Association of British Rubber Manufacturers; and J. O. Wood and W. F. Kilby, Dunlop; W. P. Fletcher, A. N. Gent, R. I. Wood, L. Mullins, and N. R. Tobin, all of BRPRA; A. R. Payne, RABRM; D. M. Turner, Avon India Rubber Co.; P. Thirion, Institut Francais du Caoutchouc; and H. J. J. Jansen, Rubber Stichting.

Developments in Testing Methods (seven papers) describes modern developments in the methods of testing rubber products. Authors are C. H. Leigh-Dugmore, E. F. Powell, S. W. Gough, D. G. Marshall, H. L. F. Jenkins, and D. H. Cooper, Dunlop; J. I. S. Williams and R. G. Clifton, Dunlop Test House; L. R. Sperberg, Sid Richardson Carbon Co.; and H. C. J. de Decker (Holland).

Compounding: Theory and Practice (five papers) deals with the most recent discoveries in rubber compounding, with particular references to the influence of reinforcing agents on wear resistance. Authors include I. Sagajllo, London Advisory Committee; V. A. Garten, Division of Industrial Chemistry (Australia); M. L. Studebaker, Phillips Chemical Co.; J. van Alphen and G. J. van Amerongen, both of Rubber Stichting.

Groups Celebrate Christmas

Boston Celebrates Silver Jubilee

THE Silver Anniversary of the Boston Rubber Group was commemorated at the traditional Christmas party on December 11 at the Hotel Somerset, Boston, Mass. More than 600 members attended the festivities, consisting of a social hour, dinner, and entertainment. Following the dinner, each member was presented with an engraved tie clasp bearing the dates 1928-1953 and the letters BRG to signify the 1928 founding of the local group under the sponsorship of the Division of Rubber Chemistry, A. C. S. The drawing of about 100 prizes completed the program.

The retiring chairman of the Group, A. W. Bryant, of Binney & Smith Co., announced the results of the recent election of officers for 1954. These were: chairman, W. F. Malcolm, of Titanium Pigments Corp.; vice chairman, E. D. Covell, Stedfast Rubber Co.; secretary-treasurer, J. E. Williamson, Tyer Rubber Co.; executive committee, Mr. Bryant, D. W. Kirkpatrick, of Boston Woven Hose & Rubber Co., A. I. Ross, of American Biltrite Rubber Co., and J. L. Haas, of Hodgman Rubber Co.; and permanent historian, Harold Fuller, retired.

Ladies' Night at Chicago

A CAPACITY crowd of 850 members, guests, and their wives attended the annual Christmas party and Ladies' Night of the Chicago Rubber Group on December 18 at the Hotel Morrison, Chicago, Ill. The program included a cocktail hour, turkey dinner, variety entertainment, and dancing. Each lady received a mink collar with the compliments of the Group.

The committee in charge of arrangements expressed appreciation to the more than 150 rubber and supplier companies whose contributions made the party possible. Bernard J. Yunker, Sirvene Division of Chicago Rawhide Mfg. Co., was chairman of the committee, with Frank E. Smith, Williams-Bowman Rubber Co., vice chairman. Other committee members were H. E. Andersen, B. F. Goodrich Chemical Co.; H. C. Crosland, Sirvene; James Dunne, C. P. Hall Co. of Illinois; Eli Grossman, Tumpeer Chemical Co.; H. G. Ling, Naugatuck Chemical Division, United States Rubber Co.; M. J. O'Connor, O'Connor & Choate, Inc.; Ralph Schell, Bauer & Black; and J. F. Swart, Van Cleef Bros. Division, Johns-Manville Corp.

Ontario Holds Old Members Night

THE Ontario Rubber Section, Chemical Institute of Canada, combined its Christmas party with Old Members Night to the enjoyment of all. Features of the celebration were the reminiscent anecdotes of those members present at the dawn of the rubber industry. One such story, told by the oldest member, W. E. Campbell, of Gutta Percha & Rubber, Ltd., recalled that rubber compounders at the turn of the century were referred to as doctors by the mixers because of their role as first-aid men in the mill rooms. Mr. Campbell was presented with a blanket in recognition of being the oldest member in attendance.

A dinner and the drawing of door prizes, between which J. M. Ball, of Midwest Rubber Reclaiming Co., presented his company's film, "Behind the Scenes," completed the program for the gathering of 90 members and guests.

Detroit Officers Announced

APPROXIMATELY 750 members and guests attended the annual Christmas party of the Detroit Rubber & Plastics Group, Inc., held December 11 at the Sheraton-Cadillac Hotel, Detroit, Mich. The party included a cocktail hour, dinner, entertainment program, and a drawing for some 250 door prizes.

The slate of candidates submitted by the nominating committee was approved unanimously, and the new officers for the coming year, as announced by outgoing Chairman E. V. Hindle, United States Rubber Co., are as follows: chairman, W. J. Simpson, Chrysler Corp.; vice chairman, J. T. O'Reilly, Ford Motor Co.; secretary, H. W. Hoerauf, U. S. Rubber; treasurer, W. F. Bauer, Brown Rubber Co., Inc.; historian, Tom Halloran, Chemical Products, Inc.; and counselors G. F. Lindner and G. P. Hollingsworth, both of Minnesota Mining & Mfg. Co., and Mr. Hindle. The following committee chairmen have been appointed: membership, J. B. Craft, General Tire & Rubber Co.; entertainment, R. C. Chilton, Permalastic Products Co.; program, H. V. Vodra, Wyandotte Chemicals Corp.; publicity, D. A. Koza, Automotive Rubber Co.; and educational, E. J. Kvet, Jr., Detroit Arsenal.

Party at New York

THE annual Christmas party of the New York Rubber Group, held in the Henry Hudson Hotel, New York, N. Y., December 11, was attended by close to 500 persons. The usual procedure of cocktail hour, dinner, entertainment by some variety acts, and the distribution of some 115 door prizes was followed.

Retiring Chairman G. N. Vacca, Bell Telephone Laboratories, introduced the new chairman, J. Breckley, Titanium Pigment Corp., and vice chairman, S. M. Martin, Thiokol Corp., during dinner.[1]

[1] A complete list of the new officers and directors appeared in our November issue, p. 226.

Rubber in Packaging

THE monthly meeting of the Washington Rubber Group, held November 18 in the Potomac Electric Co. Bldg., Washington, D. C., featured a talk by C. J. Zusi, president of Container Laboratories, Inc., on "Rubber in Packaging." Mr. Zusi covered the use of rubber as adhesives, as containers, and as cushioning devices in containers. He also detailed problems encountered in packaging synthetic rubber as manufactured by the RFC.

Although solid under most normal conditions, GR-S becomes fluid on the application of heat and pressure and, in this state, will adhere to the container in which it is shipped. Talc and sandstone have been used successfully to prevent adhesion but they present dust hazards to workers. Film wrappers of material which is compatible to some degree with synthetic rubber have met with only limited success due to the fact that the wrappers are not miscible under all conditions existing in the plants of compounders and fabricators. This problem, additionally important owing to the necessity of storing GR-S over long periods for national defense reasons, is currently the object of numerous research projects.

Fisher on Synthetic Rubber

A GENERAL outline on synthetic rubber was presented recently to the Cleveland Section, American Chemical Society, by Harry L. Fisher, president-elect of the Society and professor at the Uni-

CALENDAR

Jan.	18-22.	American Institute of Electrical Engineers. Winter General Meeting. Hotel Statler, New York, N. Y.
Jan.	22.	Philadelphia Rubber Group. Poor Richard Club, Philadelphia, Pa.
Jan.	25-28.	Plant Maintenance & Engineering Show. International Amphitheatre, Chicago, Ill. Conference at Hotel Conrad Hilton, Chicago.
Jan.	27-29.	Society of Plastics Engineers. Tenth Annual Technical Conference. Royal York Hotel, Toronto, Ont., Canada.
Jan.	29.	Akron Rubber Group. Panel Meeting. Mayflower Hotel, Akron, O.
Feb.	1-5.	ASTM Committee Week. Shoreham Hotel, Washington, D. C.
Feb.	2.	The Los Angeles Rubber Group, Inc., Hotel Statler, Los Angeles, Calif.
Feb.	3-5.	Reinforced Plastics Division, SPI. Technical & Management Conference. Edgewater Beach Hotel, Chicago, Ill.
Feb.	4.	Northern California Rubber Group.
Feb.	10.	Newark Section, SPE, Military Park Hotel, Newark, N. J.
Feb.	11.	Fort Wayne Rubber & Plastics Group. Van Orman Hotel, Fort Wayne, Ind.
Feb.	12.	Detroit Rubber & Plastics Group, Inc. Detroit Leland Hotel, Detroit, Mich.
Feb.	17.	New York Section, SPE, Hotel Gotham, New York, N. Y. Washington Rubber Group.
Mar.	2.	The Los Angeles Rubber Group, Inc. Hotel Statler, Los Angeles, Calif.
Mar.	4.	Northern California Rubber Group.
Mar.	10.	Newark Section, SPE, Military Park Hotel, Newark, N. J.
Mar.	17.	New York Section, SPE, Hotel Gotham, New York, N. Y. Washington Rubber Group.
Mar.	18-20.	Division of High Polymer Physics, APS. Detroit and Ann Arbor, Mich.
Mar.	22-24.	Committees D-9 and D-20, ASTM. Roanoke Hotel, Roanoke, Va.
Mar.	25.	Southern Ohio Rubber Group. Symposium on Synthetic Rubber Polymerization. Engineers Club, Dayton, O.
Mar.	26.	Boston Rubber Group. Spring Meeting.
Apr.	2.	Akron Rubber Group. Mayflower Hotel, Akron, O
Apr.	6.	The Los Angeles Rubber Group, Inc. Hotel Statler, Los Angeles, Calif.
Apr.	9.	Detroit Rubber & Plastics Group, Inc. Detroit LeLand Hotel, Detroit, Mich.
Apr.	14.	Newark Section, SPE, Military Park Hotel, Newark, N. J.
Apr.	14-16.	Division of Rubber Chemistry, A. C. S. Brown Hotel, Louisville, Ky.
Apr.	21.	New York Section, SPE, Hotel Gotham, New York, N. Y. Washington Rubber Group.
May	4.	The Los Angeles Rubber Group, Inc. Hotel Statler, Los Angeles, Calif.
May	6.	Northern California Rubber Group.

versity of Southern California. Dr. Fisher began by stating that although the term "synthetic rubber" is a misnomer in that the material of which natural rubber is composed has never been synthesized, its use is justified since the word rubber indicates a type of product rather than a chemical compound.

The common belief that this material is a product of the last war is false, declared the speaker, since the first rubber-like material was produced 75 years ago; tonnage quantities were made in Germany in the first World War and from 1925-1935; and the first commercial synthetic rubber, Thiokol, was manufactured in this country in 1930. The general properties and uses of synthetics were also covered, and it was pointed out that approximately 800,000 tons of synthetic rubber will be manufactured in this country this year *versus* the importing of approximately 400,000 tons of natural rubber.

Dr. Fisher was also the principal speaker at the banquet of the Society's regional conclave, December 10-12, held at the Jung Hotel, New Orleans, La. His topic was "Our Versatile Rubbers."

High-Polymer Physics Meeting

THE division of High-Polymer Physics of the American Physical Society will hold its regular meeting on March 18-20, 1954, at Detroit and Ann Arbor, Mich. Tentative plans for the conference, which will mark the tenth anniversary of the founding of the Division, include a symposium on the physical properties of bulk polymers, with the balance of the program consisting of two or three invited papers in addition to the contributed papers.

SPI Program

(*Continued from page 496*)

the direction of a 12-man SPI vinyl standards educational committee headed by J. R. Price, Bakelite Co.

Since the initial effects of this program should be apparent by spring, it was decided to postpone the SPI Film, Sheeting & Coated Fabrics Division's conference, originally scheduled for December 3-4, 1953, until some time in March or April, 1954. At that time the educational program will be included as a prominent part of the two-day conference.

Reinforced Plastics Conference

The Reinforced Plastics Division of the Society of Plastics Industry plans to hold its ninth annual Technical and Management Conference at the Edgewater Beach Hotel, Chicago, Ill., February 3-5. Noncommercial exhibits will be displayed to the public and to the attending members over the three-day period of the conference.

Test Methods for Plastic Pipe

THE formulation of test methods for the evaluation of plastic pipe has been set as the goal for the extensive engineering research program recently begun at Battelle Memorial Institute, Columbus, O. Sponsors of the program are 29 companies in the Society of Plastics Industry who are extruders of pipe and/or suppliers of the raw materials.

The program, expected to require approximately two years for completion, is intended to develop methods for determining bursting strengths, safe working pressures, long-range serviceability of pipe under static pressure, and dynamic loading limitations. It supplements work presently in progress for setting up standards on dimensional weights, sizes, and performance specifications.

Frank Martin, Guest Speaker

A TALK on "Injection Molding of Vinyl Materials" by Frank A. Martin, Hoover Co., highlighted the December 3 dinner-meeting of the Fort Wayne Rubber & Plastics Group. Held at the Van Orman Hotel, Fort Wayne, Ind., the meeting attracted an attendance of 165 members and guests and included a predinner oyster bar set up by O'Connor & Choate, Inc. Mr. Martin's paper, which will be published in a future issue of India RUBBER WORLD, covered methods, equipment, and problems encountered in the injection molding of elastomeric vinyls.

Carbon Black Statistics—Third Quarter, 1953

Below are statistics for output, shipments, producers' stocks, and exports of carbon black for the third quarter, 1953. Furnace blacks are classified as follows: SRF, semi-reinforcing furnace black; HMF, high modulus furnace black; FEF, fast extruding furnace black; and HAF, high abrasion furnace black.

	(Thousands of Pounds)		
	July	Aug.	Sept.
Production			
Furnace types			
Thermal	8,902	9,195	9,469
SRF	21,779	23,127	21,525
HMF	9,222	8,336	7,299
FEF	18,431	20,168	19,764
HAF	40,452	38,424	35,365
Total furnace	98,978	99,250	93,422
Contact types	38,177	36,914	35,295
TOTALS	136,963	136,164	128,717
Shipments			
Furnace types			
Thermal	8,580	7,262	8,248
SRF	20,323	18,117	20,718
HMF	8,185	7,759	8,677
FEF	14,938	14,524	14,859
HAF	33,991	32,777	34,495
Total furnace	86,017	80,439	86,997
Contact types	41,108	33,488	42,265
TOTALS	127,125	113,927	129,262
Producers' Stocks, End of Period			
Furnace types			
Thermal	5,404	7,337	8,558
SRF	16,409	21,419	22,226
HMF	29,719	30,296	28,918
FEF	22,849	28,493	33,398
HAF	50,719	56,366	27,236
Total furnace	125,100	143,911	150,336
Contact types	240,477	243,903	236,933
TOTALS	365,577	387,814	387,269
Exports			
Furnace types	17,024	11,745	15,557
Contact types	25,188	9,608	24,234
TOTALS	42,212	21,353	39,791

SOURCE: Bureau of Mines, United States Department of the Interior, Washington, D. C.

NEWS of the MONTH

Following a meeting on December 2 of the Rubber Business Advisory Committee of the General Services Administration, the government on December 9 announced, through GSA Administrator Edmund F. Mansure, a reduction in the monthly volume of government rotation sales of natural rubber to 5,000 tons beginning in April, and confining of forward sales to delivery in the immediate month following that in which the sale is made—a period which could range from a few weeks to 60 days. Also, a complete study of the overall rotation program and of the grades and types of rubber which should be maintained in the stockpile is to be made. These actions are a result of the complaints of natural rubber growers that American rubber policy is the cause of the depressed price of natural rubber now.

A meeting of the United States Commerce Department's Business & Defense Services Administration Chemical & Rubber Industry Advisory Committee on December 14 considered "Post Attack Planning" and heard a talk by E. G. Holt, assistant director of BDSA's Chemical & Rubber Division, in which he gave five reasons why he believes the synthetic rubber plants will be sold to private industry.

Suppliers of chemicals and other materials used in the government synthetic rubber program will only be required to renegotiate 10% of the contracts for sale of materials to the Reconstruction Finance Corp., since only that much synthetic rubber was considered to have been used in defense products.

The Rubber Manufacturers Association, Inc., called 1953 the greatest year in the history of the industry and saw only a possible 5% reduction in total rubber goods produced in 1954.

In a further report on natural rubber quality, RMA pointed out that total outstanding quality and condition claims against Far Eastern shippers stood at $558,525, on September 30, 1953, a decided improvement from the figure of $1,459,461, as of June 30, 1952.

The Natural Rubber Bureau said that for the next 16 months, or until the synthetic rubber plants are in private hands, the economic health of the natural rubber producing areas in the Far East is at the mercy of American action on synthetic rubber production and pricing.

A spokesman for the plastics industry called 1953 a record year for that industry and predicted that 1954 might surpass even the figures for that year.

Scrap rubber dealers, who had a poor year in 1953, are looking for improvement in general business conditions to result in greater consumption and higher prices for scrap rubber in 1954.

The heads of Firestone Tire & Rubber Co., The General Tire & Rubber Co., and Hewitt-Robins, Inc., find the outlook for 1954 encouraging.

Washington Report by Arthur J. Kraft

Stockpile Rotation Plan Modified; Program To Be Studied

The government on December 9 announced that it is undertaking "a complete study of the overall (natural rubber stockpile) rotation program and of the grades and types of rubber which should be maintained in the stockpile." At the same time it announced, through GSA Administrator Edmund F. Mansure, two concrete steps designed to lessen the impact of the rotation program on the natural rubber market.

These steps, the agency said, are (1) a reduction in the monthly volume of government rotation sales to 5,000 tons—half the current rate—beginning with April deliveries; and (2) confining forward sales to delivery in the immediate month following that in which the sale is made—a period which could range from a few weeks to 60 days.

GSA Rubber Advisory Committee Meeting

These two measures and the decision to make a broad study of the stockpile program resulted from meetings held on the staff and policy-making level of GSA with the State Department and the Office of Defense Mobilization. GSA, at a meeting with its 18-member Rubber Business Advisory committee, had the benefit also of dealer trade and manufacturer suggestions. The broader review now under way will find the same groups participating—GSA, State, ODM, and rubber industry representatives.

Dramatic as they sounded when first announced, the two measures put into effect by GSA actually were rather moderate. Rubber market reaction recognized this fact and greeted the measures as "disappointing." That, at least, was the reaction of the New York dealers, who had put forth suggestions calling for more drastic changes in the stockpile program at the advisory committee meeting held with GSA on December 2. Even the manufacturer representatives on that committee had urged greater modifications than adopted by GSA, although the manufacturers' suggestions were much more moderate than those advanced by the dealer trade.

The industry recommendations struck at the more basic issue of stockpile upgrading. Acting under a February, 1952, directive of the now-defunct Munitions Board (the Board's functions were absorbed by ODM), GSA has been pursuing a policy of replacing the large stockpile holdings of low-grade rubber with higher grades. For some time the rate of replacement has been 10,000 tons a month. While this is not directly injuring producers of high-grade rubber, Indonesia and other producers of low-grade rubber have complained bitterly about the depressive effect of releasing 10,000 tons a month of low-grade rubber into consumer channels. America's rubber industry is the only large-scale user of lower-grade natural rubber—the type which Indonesia sells in quantity. GSA sales directly to American consumers, they charge, are unfairly competing with the marketing of current Indonesian supplies in the U. S.

The root of the problem, as they see it, is the policy of allout upgrading. Aggravating the problem are the speed and the scale at which upgrading is being carried out, along with the attractive terms offered by GSA to its customers—low prices and acceptance of forward orders many months in advance of delivery (up to a year in a few cases, according to unconfirmed reports). The measures announced December 9 will put a partial brake on the practices which have aggravated the problem. The broader study now under way is expected to get at the root of the problem—the policy of upgrading.

At the December 2 meeting the dealer trade and manufacturer representatives each came up with different proposals, despite advance indications from their leading trade organization spokesmen of unanimity. Dealer representatives urged abandonment of the upgrading program; they wanted the lower-grade rubber now in the stockpile exchanged, as it becomes necessary to rotate to prevent deterioration, for equal quantities of lower grades. The manufacturers suggested that about 20 or 30% of the lower-grade rubber rotated out of the stockpile be replaced with lower-grades, while GSA continues to replace the bulk of its lower grades—or about 80 or 70%—with higher grades. Reportedly, there were other differences in the respective proposals of these two groups, but the foregoing appears to be the major difference which emerged round the conference table. Conference table is perhaps a misleading designation. As reported here last month, GSA did not take kindly to the charges leveled both by trade and manufacturer organizations that it was dominating and depressing the rubber market. The agency took no especial pains to muffle expression of its sense of outrage at the December 2 meeting.

Broad Study of Stockpiling To Be Made

GSA, in the period during which it served as exclusive importer of natural rubber, acquired vast holding of low-grade rubber. Probably, at least several hundred thousand tons of the one-million tons-plus now on hand in stockpile warehouses is low-grade. Under present policies GSA intends to get rid of all of it for replacement with equivalent tonnages of higher grades, known as stockpile "schedule" grades. The study now under way, which may take months to complete, will involve an inspection of the low-grade stocks, to determine just how rapidly they must be replaced to prevent their deterioration. It will also get into the more basic policy question of whether the stockpile schedule —that is, the composition of the permanent stockpile—should make room for lower grades of rubber.

The interim relief announced by Mr. Mansure on December 9 will not be fully effected for several months. GSA already is committed under existing contracts with consumers to deliver 10,000 tons monthly through March, 1954. These con-

tracts will be honored. Since GSA also is now bound on all contracts entered on December 9 or later to deliver no further ahead than the month following issuance of a sales contract this policy means that GSA will make no additional sales until March, when it can sell for April delivery. This decision puts GSA out of the market as a seller until March 1. The agency also had entered sales contracts prior to December 9 for delivery in April and succeeding months. Scheduled deliveries under these contracts for the April-May-June quarter reportedly are close to the 5,000-ton-a-month limitation of the new policy. These contracts, too, will be honored. Thus GSA will be entering new contracts, come March, for delivery in April of a good deal less than 5,000 tons. Moreover, unless some new change is instituted in the upgrading program, rotations will continue to be exclusively the sale of low-grade rubber for replacement only with high-grade stock.

The overall study of the stockpile program which could result in some directive making more basic changes will provide for full industry consultation, GSA officials said. It is understood that GSA will appoint a six-member subcommittee from its Business Advisory Committee, consisting of three dealer and three manufacturer representatives, under George Casto, for this study.

Since basic changes in stockpile policies are a matter for ODM decision, there is a possibility that ODM industry advisers would work on the study. ODM now has no such committees, but is working on an agreement with the Commerce Department for using the advisory committees of that agency's Business & Defense Services Administration, successor to the National Production Authority. However the chances are that the GSA committee will be used to advise ODM in this particular study.

While the scope of the study has not been definitely stated by any of the agencies concerned, it is possible that it may include the question of the ultimate size of the stockpile, along with the already described question of the composition of the stockpile. At its London meeting this past fall, the Management Committee of the International Rubber Study Group recommended that member governments consider the possibility of increasing their stocks of natural rubber, whether privately held or government held. This recommendation, contained in the official communiqué from that meeting, was not aimed specifically at the U. S., and even so may have been intended to apply more to industry stocks than government stocks.

Thus, this suggestion has a somewhat different character than the three recommendations specifically aimed at the U. S. Government: (1) revocation of the mandatory consumption directive for synthetics (it was revoked in November); (2) reexamination of stockpile rotation practices; and (3) increasing the price of GR-S. Besides, at the Congressional hearings on disposal legislation early last summer, a Munitions Board official testified that there is some feeling that the present rubber stockpile goal—now nearly fully attained—already provides for more natural rubber than we would need in event of war. So far as this reporter knows, no one in a responsible position, either in government or industry, has taken the position that the present stockpile goal is inadequate and should be enlarged.

Members of GSA Rubber Advisory Committee

Members of the GSA Rubber Business Advisory committee are: H. P. Shrank, Seiberling Rubber Co.; R. B. Bogardus, Goodyear Tire & Rubber Co.; E. C. Schwaub, United States Rubber Co.; Fred Pusinelli, Fred Pusinelli & Co.; Alan L. Grant, Charles T. Wilson Co.; Sid Pike, S. J. Pike & Co.; H. P. Van Valkenburgh, Dunlop Tire & Rubber Co.; Ralph Au, The B. F. Goodrich Co.; C. J. Zabeck, General Tire; D. A. Patterson, H. A. Astlett Co.; M. Millintheau, Robert Badenhop Corp.; Robert Riley, Imperial Commodities Co.; Edward W. Kane, American Hard Rubber Co.; J. C. Roberts, Firestone; James Adams, Sears, Roebuck & Co.; Fred Koyle, Carl M. Loeb, Rhoades & Co.; J. L. Lewis, Littlejohn & Co., Inc.; and Jacobus Frank, Jacobus Frank & Co. Chairman of the committee is George K. Casto, Director of GSA's rubber division.

BDSA Chemical & Rubber Committee Meets on Mobilization Planning

The initial meeting of the Business & Defense Services Administration of the Commerce Department with its newly formed Chemical & Rubber Industry Advisory committee was held in Washington, December 14. The 16 committee members who attended, including two from the rubber industry, were informed by officials of the agency's Chemical & Rubber Division that the primary function of BDSA in the coming year will be to carry out its responsibilities in connection with defense mobilization programs. A good deal of attention was devoted at the December 14 meeting to general discussion of measures to minimize interruption of chemical and rubber manufacturing activity resulting from atomic or other aerial attack. This type of preparatory activity on the part of industry has become known here as "Post Attack Planning."

BDSA officials told the committee that the agency is charged with bringing into being the plans for plant, product, and personnel protection and "possible decentralization of facilities." Handling this phase of the agency's activities for chemicals and rubber is Everett G. Holt, the assistant director of the BDSA Chemical & Rubber Division. The Division has put together a comprehensive booklet covering various measures which individual firms may use in disaster planning.

Decentralization of production facilities to reduce the vulnerability of the nation's industrial defense to atomic destruction is a subject which BDSA's predecessor, the National Production Authority, had broached to its Rubber Industry Advisory Committee some 10 months ago. The rubber industry will likely hear much more on the subject from BDSA. For one thing, BDSA has reactivated the old NPA Rubber Industry Advisory Committee for the specific—and so far the only—purpose of working out plans for decentralization of rubber manufacture, should that become necessary.

In letters to committee members last month Mr. Holt asked for their views on decentralization and other aspects of "Post Attack Planning." He sent them copies of a report suggesting an outline of the problem and asked whether the committee members thought a meeting should be called in the near future. There's a fair chance that the rubber committee will meet with him in January, or soon after. The committee, when advising the now-defunct NPA, had the benefit of a preliminary review of the "Post Attack Planning" problem—including a specific suggestion from NPA that new airplane tire plants should be located elsewhere than Akron. The rubber committee will be called upon for extensive review of disaster planning, but apparently its advice will not be sought on other subjects of interest to the industry.

The forum for seeking the rubber industry's counsel on other matters will be the Chemical & Rubber Industry Advisory Committee, now comprising 19 members of the chemical industry and only three from the rubber industry. Plans are under way to enlarge the membership, particularly to give greater representation to rubber manufacturers.

According to report, the committee, when enlarged, will include one rubber industry representative for each three chemical industry men, thus giving the rubber industry 25% of the membership. The three rubber industry representatives now on the committee are P. W. Litchfield, Goodyear chairman; Charles C. Gates, Jr., president of Gates Rubber Co.; and Thomas Robins, Jr., president of Hewitt-Robins. The 16 members who attended the December 14 meeting included Mr. Robins and Leland Spencer, substituting for Mr. Litchfield.

The committee offered to come to Washington again in January to discuss such matters as excise taxes, corporation taxes, labor, and legislation and to present industry views on these subjects to Commerce Department officials. The political nature of these subjects provides some idea of the broad area in which the BDSA advisory committees may operate.

In the review of "Post Attack Planning" which took place at the initial meeting last month, BDSA told the committee that the government is prepared to aid manufacturers in establishing plant protection by authorizing rapid tax amortization where feasible. The officials also informed the committee that the agency plans to collect statistical data on a voluntary basis for some 30-odd chemicals and to publish these annually. The officials assured committee members that these data will be guarded and so published as to prevent disclosure of the operations of individual firms. Norman E. Hathaway, director of the BDSA Chemical & Rubber Division, presided at the meeting.

Mr. Holt reviewed for the committee the status of disposal of synthetic rubber facilities and gave five reasons why he believes the plants will be sold, despite some "hampering legislative provisions" in the disposal act. Here are Mr. Holt's five reasons for "hoping that the disposal will be accomplished despite these provisions."

"First, the world rubber supply-demand situation is such that a normal average annual demand for at least 450,000 tons of GR-S and 70,000 tons of Butyl is generally foreseen for the near future. The consensus is that tthe demand for chemical rubber will increase as time passes, as world rubber consumption will undoubtedly increase; while world production of natural rubber is expected to increase to a smaller extent.

"Second, countries consuming rubber outside the United States will find it difficult to finance large imports of chemical rubber from Canada and the United States. In the case of several important countries, their ties with the regions which produce natural rubber are such as to constitute a political barrier to their large use of or production of synthetic rubber. Consequently, as a result of rising consumption of rubber, they will presumably take a larger part of the world output of natural rubber as the years pass.

"Third, this chart [Mr. Holt presented a chart in his talk to the committee—EDITOR] shows that U. S. consumption of new rubber has increased at an average annual rate of 4.9% during the past 30 years. If the chart has any meaning, the outlook for future long-term growth is excellent. The chance is that growth will have to be supplied more by chemical rubber than by natural rubber.

"Fourth, the government does want to sell the plants. It is anxious to get out of rubber production because of the representations from foreign nations that the government monopoly in production of GR-S and Butyl results in unfair competition for their producers of natural rubber. There is little likelihood, in my opinion, that such claims will cease even if the ownership is transferred to private firms.

"Finally, I think the members of the U. S. rubber industry are tired of government in the rubber business; and fully alert to the dangers of continued and increasing government intervention in their affairs if the government continues in the rubber business. In this one factor, it seems to me, there rests our one best hope that the disposal program will be accomplished. The opportunity, if it passes without success, may not come again. Coupled with the attractive general outlook for future demand for chemical rubber, the program in my opinion should succeed."

Rubber Facilities Commission Activities

Printed instructions on how to enter proposals for purchasing government owned synthetic rubber plants and related facilities were issued by the Rubber Producing Facilities Disposal Commission on November 25. The instructions generally followed the language of the disposal law enacted this past summer and that of the newspaper advertisements placed by the Commission on November 18, announcing that the Commission would be open to receiving purchase proposals from November 25 through next May 27, inclusive, for the 26 rubber plants and miscellaneous facilities.

By late December the Commission had received a substantial number of inquiries for additional information on preparing purchase proposals, but had yet to receive its first bid, officials said. The queries indicated that many bid proposals were being prepared in company headquarters throughout the land. The Commission, with considerable assistance from RFC, was putting the final touches on the brochures giving factual data on operations and facilities of each of the plants up for sale (the two alcohol-butadiene plants have been offered for sale or for immediate lease). The first of these brochures was in printed form early in December, and completion of the remainder was expected about December 31. The Commission, at this writing, is yet to decide how wide a distribution to make of the brochures—whether to confine them to persons contemplating entering bids, or to make them available to the general public.

The detailed instructions, available from the Commission in booklet form, stated that the Commission will accept bids on "portions" of any producing facility, as well as on an entire facility.

"By way of illustration," the instructions read, "it has been suggested that the butadiene facility at Port Neches, Texas (Plancor No. 933), may be capable of division into segments of one-half of the total productive capacity thereof."

A Commission official denied that this statement could correctly be interpreted as a decision or even a hint that the Commission intends to split up the giant Port Neches butadiene plant into two units for purposes of sale. He insisted that such a construction upon the Commission's selection of this particular facility for purposes of illustrating willingness to receive bids for "portions" of any facility was unwarranted at this time. As noted in this space last month, Commission and Justice Department attorneys are in the preliminary stage of considering whether to split up the Port Neches plant for bidding purposes, in view of the fact that this plant, with an annual producing capacity of nearly 200,000 short tons, accounts for close to 40% of the combined capacity of the eight petroleum butadiene plants which are now owned by the government and which are being put up for sale.

The Commission official would not say who had "suggested" that the Neches butadiene plant "may be capable of division into segments of one-half of the total productive capacity thereof." Suggestions, however, that the plant might be divided into two or more segments have cropped up in conversations among persons outside of the Commission who are conversant with disposal problems. In such conversations it has been suggested that splitting up this plant probably would result in more attractive purchase proposals and would avoid bestowing an undesirable degree of economic control over the synthetic rubber industry to any single purchaser. The facility now is operated for RFC by the Neches Butane Products Co., in which four petroleum refining companies participate.

The instructions also require that "proposals relating to a butadiene of Butyl rubber (GR-I) facility shall, if the prospective purchaser is a petroleum refiner furnishing or intending to furnish feedstock to the facility from its own refinery operations, present an estimate of the quantity of feedstock which he would have available for sale to the purchaser of the facility in each of the years 1955, 1956, and 1957. . . ."

Renegotiation of GR-S Material Suppliers Contracts Limited to 10% of Total

Some 15 or 20 suppliers of chemicals and other materials used in the government synthetic rubber program got a break last month—but it took some smart unravelling of bureaucratic "red tape" to manage it. The matters at issue were the contracts under which these suppliers sold materials to RFC for use in making GR-S synthetic rubber.

Under the contracts renegotiation law, all companies which sell to certain federal agencies, RFC among them, are required to submit those contracts to the Renegotiation Board. This law is the device authorized by Congress as a double-check on the prices charged the government for defense goods. Thus, if the government, in its haste to procure items needed for the defense program, pays excessive prices, the Renegotiation Board, postchecking procurement contracts, is expected to determine where excessive prices were paid and order rebates to the government.

The Renegotiation Board ruled that the contracts of RFC suppliers were subject to 100% renegotiation, but the Board later reversed itself when the suppliers contended that only a small portion of the GR-S made from their materials was ultimately used in filling direct defense orders. Most of the GR-S, they pointed out, was used in making tires and other products for sale to the general public.

The Board agreed to require renegotiation of only that portion of the raw materials supplied under the contracts to RFC which corresponded to the amount of GR-S consumed in the production of end-products sold to the military. The problem was to find out how much GR-S was used in making items for the military.

Under the statute RFC was required to make known this information to its suppliers. But for military security reasons these data were put under secrecy wraps by NPA, which had collected them. RFC, therefore, put in a request to NPA's successor, BDSA, to de-classify the data so they could be made available to RFC's materials suppliers.

BDSA de-classified the data on December 7 "in order to assist in the settlement of cases for renegotiations of contracts pending before the Renegotiation Board." Here's what the data showed:

Over the 30-month period which ended June 30, 1953, 10% of the GR-S consumed in this country went into items procured by the military directly from rubber goods manufacturers (that is, "direct defense orders" which do not cover the rubber components of those military end-items supplied by other industries). The actual figures showed total consumption of 1,645,-797 long tons of GR-S, of which 165,350 tons were used for direct defense procurement items.

The percentage declined toward the latter part of the 30-month period. BDSA figures showed a total GR-S usage in 1951 of 625,169 tons, of which 71,124 tons, or 11.4%, went into defense orders. For 1952, total usage was 666,420 tons, of which 63,727 tons, or 9.6%, went into defense orders. For the first half of 1953, total usage was 354,208 tons of which 30,499 tons, or 8.6%, went into defense orders.

Renegotiation of the contracts between RFC and its raw materials suppliers can now proceed, with only 10% of the money paid out under these contracts subject to renegotiation. Up for renegotiation are only the contracts entered during the 30-month period which ended last June 30, when the Defense Production Act and the requirement of defense contract renegotiation expired.

Still under security wraps, incidentally, are data on the total amount of rubber (including other types of synthetics, natural rubber, etc.) used in making military items, since these data have not been required for contract renegotiation purposes.

RFC Synthetic Rubber Production and Sales

November sales of GR-S synthetic rubber amounted to 41,889 long tons; while production for December was scheduled at 44,405 tons, RFC reported last month. Butyl sales in November totaled 4,592 tons, and December output was scheduled for 6,000 tons.

The 44,405-ton GR-S output set for December includes a large portion of oil masterbatch rubber—14,100 tons. For purposes of comparison, November's output of 42,700 tons of GR-S included only 7,160 tons of oil masterbatch polymers. Excluding the oil contained in the oil masterbatch and oil-black masterbatch polymers, December scheduled output is reduced to 40,600 tons on a net, less oil, basis.

Here are RFC's figures for actual November sales and scheduled December output of GR-S, on a net plus oil basis:

November sales—total GR-S, 41,889 tons; LTP GR-S, 28,380; black masterbatch, 4,983; oil masterbatch, 8,953; oil-black masterbatch, 1,778; latex, 3,650. December output—total GR-S, 44,405; LTP GR-S, 29,600; black masterbatch, 5,000; oil masterbatch, 14,100; oil-black masterbatch, 1,800; latex, 3,600.

Funds for Spain and Austria Rubber Buying

The Foreign Operations Administration (FOA) has authorized Spain to spend $1 million of U. S. foreign aid funds for the purchase of crude rubber from Indonesia, Singapore, Thailand, Indo-China, or Liberia. FOA, which approved the grant on December 9, said Spain must make the purchase by April 30 and must take delivery of the rubber no later than July 31, 1954.

The agency also announced that a similar purchase authorization has been granted to Austria in the amount of $100,000 for procurement of rubber products in the United States, U. S. possessions, or Canada. The contract must be made by April 30, and delivery must be no later than July 31.

Other National News

RMA Annual Summary Predicts Another Good Year in 1954

TABLE 1. U. S. RUBBER CONSUMPTION IN LONG TONS

	1941	1950	1951	1952	1953
Natural	775,000	720,268	454,015	453,846	555,000
Synthetic	6,259	538,289	760,283	807,567	786,000
Total	781,259	1,258,557	1,214,298	1,261,413	1,341,000
Reclaimed	251,231	303,733	346,121	280,002	284,000

In its annual summary of the industry's activity RMA called attention to the fact that 1953 consumption of new rubber was by far the greatest in the history of the industry, and that 1954 should see no more than a 5% reduction in total rubber goods produced.

In 1953 rubber consumption will have hit a record-breaking 1,341,000 long tons, and industry statisticians estimate that 1954 consumption will be only slightly less than this figure. The substantial rise in consumption and the tremendous increase in synthetic rubber consumption over the years is reflected in Table 1.

Tire and tube manufacturers, who make up the largest single rubber consuming segment of the industry, produced 100,500,000 units in 1953. Of this number, 82,000,000 were passenger-car tires, 14,700,000 truck-bus tires, 3,800,000 farm equipment tires, airplane and industrial pneumatic tires.

Replacement passenger-car tire sales in 1954 are expected to exceed the 47,500,000 sold in 1953. Production of belting and hose and many other mechanical rubber goods is expected to equal the record output of 1953 on the strength of the expansion of productive facilities in other industry. The foam rubber market continues to grow.

These growth items among upward of 40,000 different types of rubber products manufactured annually are counted on to cushion substantially the impact of moderate declines predicted in the automotive industry and other industry markets for rubber parts, with the result that total production of rubber goods is not expected to taper off more than 5% in 1954.

Production of heavy industrial rubber goods, including all types of industrial hose and power belting and conveyor belting, is expected to remain at or near the 1953 level.

The growth in the use of rubber tile and rubber roll flooring recorded in 1953 is expected to continue in 1954. Manufacturers of rubber drug sundries improved unit production across the board in 1953.

While the mild winters in the Eastern portion of the United States have reduced the demand for protective rubber footwear, the general good weather has broadened the market for rubber-soled canvas footwear, particularly in the newer and more colorful sports line.

The coated fabrics segment of the rubber industry produced about 50 million yards of finished goods in 1953 and expects to maintain about that volume in 1954.

Figures on factory employment in the rubber goods manufacturing industry are not yet available for the full year. Over the first eight months, however, factory employment averaged 218,600 clockcard workers. Average hourly earnings of employes in the tire and tube industry in that same period rose to a new high of $2.23 an hour, a figure that does not reflect either a general wage increase or extensive fringe benefits which were granted late in the summer.

Most significant single development nationally in 1953, from the industry's standpoint, was action by Congress to authorize the sale to private industry of government owned synthetic rubber facilities, the RMA said. The Rubber Facilities Disposal Commission, which began taking bids on these plants November 25, 1953, is reported unofficially to have received by mid-December more than 100 expressions of interest.

Negotiations, as provided by law, will continue for a period of seven months after May 27, 1954, the closing date for receipt of bids. After a review of the sales proposal by the Attorney General and a review by Congress of the Commission's detailed report on the proposed sales, there will be a final decision some time in the Spring of 1955.

Natural Rubber Industry Concerned about 1954

The Natural Rubber Bureau, Washington, D. C., through its retiring president, W. S. Lockwood, said in a year-end statement that the two outstanding rubber factors of 1953 were the passage of synthetic rubber plant disposal legislation and the 10¢-a-pound drop in the price of natural rubber.

The natural rubber growers hope that the synthetic rubber plants will be in private hands by the April, 1955, date called for in the legislation, but are concerned about the 16-month interim before the synthetic plants are sold.

The drop in the price of natural rubber from 30¢ a pound in January, 1953, to approximately 20¢ a pound in December confronts the natural rubber industry with the worst economic crisis since the depression, it was said. Actually, the fall is worse than the apparent 33⅓% drop. Based on 1952's yearly average price of 40¢ a pound, 1953's average of 24¢ a pound meant a 16¢-a-pound drop in income for the producers. Rubber income for southeast Asian producers fell the equivalent of $575 million; for Malaya alone, the equivalent of $200 million.

The action of American government officials concerned with rubber policy in following some of the suggestions growing out of the May, 1953, meeting of the International Rubber Study Group and the subsequent October meeting of the Special Management Committee, to give the natural rubber market a chance to adjust to a more logical level, were welcomed, but considered still inadequate. NRB said the most important additional move that could be made would be to adjust the price of GR-S from its present 23¢ a pound to one more closely approximating the commercial level almost all observers agree will result when the plants are sold to private industry.

"For the next sixteen months, though—until the synthetic rubber plants are sold and the natural rubber industry is on its free competitive own, Southeast Asian economic health is at the mercy of American action on synthetic rubber production and pricing," it was concluded.

NRB estimated rubber consumption figures for 1953 and its forecast for 1954 appear in Table 2 (on page 508).

Scrap Dealers Look for Better Year in 1954

The year 1953 was a very poor one for the dealer in scrap rubber, Milton Kushkin, of A. Schulman, Inc., and president of the National Association of Waste Material Dealer's Scrap Rubber & Plastics Institute, said in a year-end statement.

Prices moved within a very narrow limit, with tires bringing $13.50 per net ton from the reclaimers throughout most of the year, the same price level in effect in 1950 prior to the Korean War. Freight rates and other handling costs have advanced considerably since 1950; so the result is that the net price for a dealer handling rubber has been reduced.

The demand for split parts was very limited. Producers in areas not close to the reclaiming centers have been burning and destroying their S. A. G. The peels have been bringing enough to justify saving them, but most of the year more peels were produced than consumed, and prices were low.

The price for red tubes was good, but toward the end of the year very few reclaimers were interested in buying at any

TABLE 2. 1953-54 ESTIMATES OF WORLD NEW RUBBER PRODUCTION AND CONSUMPTION

	1953			1954		
	Nat.	Syn.	Total	Nat.	Syn.	Total
			Production (in 1,000 Tons)			
U.S.A.	—	840	840	—	660	660
Malaya	575	—	575	575	—	575
Indonesia	695	—	695	685	—	685
Rest of world	440	80	520	440	90	530
Total	1,710	920	2,630	1,700	750	2,450
			Consumption (in 1,000 Tons)			
U.S.A.	550	780	1,330	600	680	1,280
Rest of world	1,010	80	1,090	960	80	1,040
Total	1,560	860	2,420	1,560	760	2,320

price because the supply of this-type scrap is nearing an end. The market for black tubes was also good, but the supply is drying up here also.

Butyl tube scrap was available in much larger quantities than the reclaimers would consume; so the price dropped to about the 2¢-a-pound level. The outlook is for continuation of this low price until greater demand develops.

Lower prices for natural rubber reduced the consumption of synthetic rubber during the year.

Prices for plastics scrap were steady to strong throughout the first three quarters of the year, but during the final quarter prices were lower, and some grades were selling at about one-half the price they obtained earlier in the year.

In spite of the poor showing made by scrap rubber in 1953, Kushkin believes that 1954 will be a better year for business in general, and scrap rubber, having touched the bottom, should move forward toward greater consumption and higher prices in 1954.

Bakelite Predicts Another Record Plastics Year in 1954

More plastics raw materials were produced and sold by the industry in 1953 than in any previous year, and George C. Miller, president of Bakelite Co., a division of Union Carbide & Carbon Corp., predicts that the plastics industry in 1954 may surpass even the record production and sales figures of the past year.

"The plastics industry in 1953 was particularly sensitive to general business conditions, new consumer trends, and even fads," Miller said, pointing out how the do-it-yourself trend accounted for a greatly increased demand for wall tile molded of polystyrene.

This year was also one of the banner sales years for phonograph records, most of which are made of compounds based on vinyl chloride-acetate and styrene resins.

"Intensive industrial activity during the year resulted in a very large volume of sales for phenolic molding materials," Miller observed. "Increased usage of large molded pieces, such as television cabinets and drawers for furniture, contributed to the large volume of these sales."

Highlighting the past year in the plastics industry was Bakelite's announcement about polyethylene production, the largest expansion program in the history of the industry. The program calls for three plants, each with a rated annual capacity of more than 60,000,000 pounds of polyethylene.

Miller said that production and sale of vinyl resins continued at a high rate during 1953, and that he believed that the vinyls have not yet reached their levelling-off point. In 1953 the flooring industry doubled its use of vinyl resins, and further developments in combinations of vinyl sheeting and knitted cloth or vinyl-coated knitted cloth accounted for increased use of vinyl resins.

Developments in reinforced plastics in 1953 included a number of potentially large-volume applications, it was revealed. These new uses for glass fibers impregnated with various types of plastics resins include bodies for sports autos, tubing and pipe and chemical tanks. It is expected that these new applications will grow rapidly during 1954.

Among the new uses for phenolic resins during the past year was the use of this material in the form of microscopic bubbles, which, when floated in a thin layer on top of crude oil in tanks, save the petroleum industry as much as $60 million a year.

Largely because of a slump in the sale of housewares in the last half of 1953, the sale of polystyrene did not meet forecasts for this material, Miller stated. An important factor in the fabrication of polystyrene parts this past year, however, was extensive use of high-impact, or break-resistant styrene plastic, which gave more satisfactory performance in toys and refrigerator parts.

"One of the softer spots," Miller noted, "was the production and sales of vinyl film and sheeting. Some of the softness results from misuse of vinyl film and sheeting and poorly fabricated products made of these materials." To combat this decline, Miller added, "Bakelite Co. has embarked on a radically new and integrated merchandising program, aimed at consumer, retailer, and manufacturer alike, to acquaint them with the real value of products properly made from vinyl film and sheeting."

1954 Outlook Encouraging to Firestone

The rubber industry had its best year in 1953, with a record-high sales volume to exceed 1952's figure of $5,233 billion, according to Harvey S. Firestone, Jr., chairman of the Firestone Tire & Rubber Co., whose company's sales in 1953 exceeded $1 billion for the first time in its history.

Business prospects in 1954 for tire dealers were considered very encouraging because there will be about one million more passenger cars, trucks, and buses two or more years old than there were in 1953. Although announced estimates for 1954 car and truck production have been somewhat lower for 1953, the steadily increasing demand for replacement tires is expected to enable the rubber industry to operate at normal capacity levels during 1954.

Supplies of both natural and synthetic rubber were ample to meet the requirements of the industry in 1953, and there was less fluctuation in price than during 1952.

There is a growing confidence in the future of natural rubber, as evidenced by large-scale replanting programs in the Far East, the Firestone chairman said. He added that this activity supports the opinion based on experience with Firestone plantations in Liberia that efficient plantations can be profitably operated in competition with synthetic rubber.

Firestone plant capacity has been materially increased, and manufacturing processes have been improved in all production divisions including passenger-car, truck, tractor, and earth-mover tires; foam rubber; mechanical rubber goods; defense products; reclaimed rubber; plastics fibers and basic resins.

Attention was called to the fact that the manufacture of products other than tires and tubes continues to be the most rapidly growing phase of Firestone's business. The reason was given as the great demand for foam rubber products.

O'Neil Sees Augmented Selling and Research in 1954

American industry should forge ahead in the challenging business climate of 1954 through augmented selling and dollars plowed back into research, according to William O'Neil, president of General Tire. Renewed service selling together with new products coming from the laboratory will form a barrier against any recession, he added.

Although final figures will not be available until February, General Tire expects sales to reach an all-time high at approximately $210 million, and earnings to be about $6 a share.

In 1954, this company stands in a position to capitalize on a banner year in replacement tire sales and to push forward its activities in plastics, chemicals, mechanical goods, foam rubber, rockets, radio and television.

O'Neil said that General's chemical division should about triple its volume in plastics next year with completion of the Ashtabula, O., polyvinyl chloride plant. The future is bright in mechanical goods as new molded and extruded products hit the market, and demand soars, he continued.

"General, third in the foreign market, is garnering an increasing share of the tire and tube market abroad, and expanding in this field with retention of profits from current operation," O'Neil said.

Robins Predicts Good Year for Non-Tire Lines

The non-tire segment of the rubber industry will operate in a highly competitive market in 1954, and companies can be expected to put forth increased selling effort, according to Thomas Robins, Jr., president of Hewitt-Robins, in his year-end statement. He expects the 800 companies making non-tire products to do as much business as in 1953 and to consume about 470,000 tons of rubber, or 35% of the industry total.

The outlook is particularly promising for conveyor belting and foam rubber, it was said. The demand for conveyor belting is steadily rising because of industrial expansion and the increasing mechanization and modernization of mines, mills, and factories. Foam rubber is gaining in popularity in the furniture and automobile industries because of the increasing consumer demand for this type of cushioning.

Robins indicated that he thought that the crude natural rubber market in 1954 would be fairly stable. The savings to rubber goods manufacturers by virtue of the present lower price for natural rubber are more than offset, however, by a rise in operating costs, particularly labor, transportation, and plant equipment. As long as overall operating costs remain at the present high levels, rubber goods manufacturers are not likely to be able to reduce their selling prices, Robins concluded.

Litchfield on the Highway Problem

In another one of his "Notes on America's Rubber Industry—No. 20," entitled, "A Missing Key to Our Highway Problem," P. W. Litchfield, Goodyear chairman, emphasized that the national problem of inadequate highways can only be solved as we solve the multitude of local problems. He urged that efforts be concentrated on getting roads built and bridges and streets widened in our own neighborhoods, in our own cities, and in our own states.

Litchfield emphasized that to continue our economic progress we will have to have more highways rather than less traffic. Greatest obstacle to progress in highway improvement is the matter of cost, but the cost of not having adequate highways is actually proving much more staggering than the cost of providing them, he added.

Guidance for community organizations is available from Project Adequate Roads, 952 National Press Bldg., Washington, D. C., a cooperative movement of more than 40 national organizations interested in getting better highways and streets, the Goodyear chairman pointed out.

"Thus, the key to highway progress is within the reach of every American community," Litchfield concluded. "If a sufficient number of them will grasp and utilize this key, I believe we will begin to get the kind of fast, decisive action this crisis calls for."

RMA Further Report on Rubber Quality

Rubber Quality Bulletin No. 5 of the Crude Rubber Committee of the Rubber Manufacturers Association, issued under the date of December 10, pointed out that as of September 30, 1953, the total outstanding quality and condition claims against Far Eastern shippers of crude natural rubber stood at $558,525.42, a decided improvement from the figure of $1,459,461, as of June 30, 1952. Included in the latter figure was $351,597.15 of claims outstanding prior to January 1, 1951, which are considered uncollectable and are not included in the September 30 total. It was emphasized that these figures indicate the magnitude of the natural rubber quality problem, and the uncollectable figure represents actual losses sustained by importers of natural rubber.

In another part of this bulletin, an apparent limitation on natural rubber use in this country was discussed. World natural rubber production and consumption could be balanced in 1955 by 47% use in the United States. For the years thereafter the ratio must decline each year to only 35% in 1958. Even if the highest natural rubber production estimate is used, it is indicated that there will not be available enough natural rubber from 1955 on to maintain 50% use in the United States. There should be an ample supply of synthetic rubber, however, to meet the expanding future requirements and make up for the inability of the natural rubber industry to expand its production.

Still hoping to win agreement of Far Eastern interests on a United States site for the proposed International Conference on Packing & Grading, the RMA and the Rubber Trade Association of New York have jointly drafted a proposed agenda covering topics proposed for discussion.

Every one of the 11 agenda items relates to a condition of rubber on arrival and bolsters the claim of the two associations that these matters can only be discussed properly in this country. Since the topics listed give rise to most U. S. rejections and claims, it is felt that representatives of producer, packer, and shipper groups will have to view the rubber on arrival to understand the scope and gravity of this problem, the bulletin said.

In deference to the 11 foreign associations concerned, which have been urging Singapore as a first meeting site, the joint RMA-RTA letter invited those groups to submit a draft agenda for comparison.

"Through this interchange, and after carefully weighing the pros and cons, both of us," the letter said, "should be able to arrive at a sound determination as to where the proposed meeting should be held."

The letter was signed by W. J. Sears, vice president of RMA, and R. D. Young, president of RTA.

Keener's Three-Way Labor Relations Program

J. Ward Keener, vice president of The B. F. Goodrich Co., in a recent talk before the National Industrial Conference Board in Pittsburgh, Pa., declared that sound industrial relations in unionized plants and companies can only be established if full consideration is given to management organizations, to union organizations, and to employes as individuals. This three-way program must be fully integrated before positive results can begin to appear.

The company that confines its attentions mainly to the union, expecting the union to be its major pipeline, channel, and voice, and largely ignoring the employe group, except for necessary work instruction, is inviting trouble of one kind or another.

On the other hand the company that directs its attentions exclusively to the employe group, ignoring the proper functions of the unions chosen by the employes to represent them, also will have troubles, the Goodrich vice president warned.

Unions can infuse positive efforts into this three-way industrial relation by helping to create employe understanding that employe and union security and progress depend entirely upon company security and progress. There can be little getting where there is little giving, it was added.

Keener pointed out that unions can give recognition to the fact that if strikes are the union's ultimate weapon, then the ability and the willingness of companies to endure strikes are companies' ultimate weapons. Too many strikes occur; too many industrial tragedies result; and too many social losses ensue because of the failure of one party, or both, to understand this fundamental, he said.

Management organizations can move forward aggressively by examining existing policies, by anticipating needs, and developing new policies that are sound and forward looking, and by creating broader and deeper understanding of policies and encouraging more humaneness in their application. It is necessary to strive, within policy limits, for more management discretion, initiative, and flexibility in carrying out employe relations responsibilities, it was concluded.

Cyanamid Realines Set-Up

K. C. Towe, president of American Cyanamid Co., 30 Rockefeller Plaza, New York 20, N. Y., on December 23 announced several changes in the managerial organization of the company, effective January 1.

Kenneth H. Klipstein has been appointed general manager of the newly created research division of American Cyanamid. This division will be responsible for the operation of the Stamford research laboratories under the direction of J. T. Thurston. It will also supervise other research and development programs not the direct responsibility of operating divisions and will coordinate these programs with related activities of the operating divisions.

A new division, the organic chemicals division of American Cyanamid, has been organized. L. C. Duncan is now its general manager, and V. E. Atkins, assistant general manager. The organic chemicals division will merge and consolidate the activities of the petrochemicals division with those of Calco Chemical Division.

Another change has created the fine chemicals division of the company, with A. B. Clow as general manager and A. R. Loosli as assistant general manager. This division will operate the Princeton, N. J., plant (recently purchased from Heyden Chemical Co.) and will handle domestic sales of bulk antibiotics, bulk pharmaceuticals (including those heretofore produced and sold by Calco Chemical), and the animal feed products formerly handled by the Lederle Laboratories Division.

The new pigments division will be responsible for the production and sale of titanium dioxide and other pigments formerly handled by Calco Chemical. J. Allegaert has been named general manager, and A. B. Hettrick, assistant general manager, of this division.

In making the announcement Mr. Towe pointed out that these changes make it possible for S. C. Moody and R. C. Swain, vice presidents, to devote all their time to general staff matters and to assist in determination of company policy.

Mr. Towe said that these changes were made to keep the organizaton in line with the continued growth of the company and to streamline management operations.

Sharples Chemicals Moves

Sharples Chemicals, Inc., on December 21 moved its executive offices to 1100 Widener Bldg., Philadelphia 7, Pa.

The company has also announced two additions to its sales staff. William Steed will represent Sharples in the Southwest, with headquarters in New Orleans, La. Thomas Baize is presently working as sales assistant in the Philadelphia executive office.

H. Muehlstein & Co., Inc., 60 E. 42nd St., New York 17, N. Y., held a Christmas dinner-dance for the employes of the New York office and their spouses at the Biltmore Hotel on December 12. Some 166 persons, including Mr. and Mrs. H. Muehlstein, attended.

Smog-Resistant Tires

Passenger-car tires of The Firestone Tire & Rubber Co., Akron, O., are being protected from attack by smog, chemical fumes, and smoke through the incorporation of a new material into the rubber, according to a recent announcement from the company. The new material is reported to provide a film-like coating on the sidewalls and other parts of the tire to resist smog deterioration and weather checking and cracking.

Expansion Program at Des Moines

Approximately $6,000,000 is being spent by Firestone to expand its tire plant facilities at Des Moines, Iowa. The program, already under way, consists of the addition of more than 100,000 square feet to the manufacturing area, 10,800 square feet to the office space, three electric substations, and various installations for accommodating the plant's personnel. Plans called for the completion of the new factory building late last year, with production beginning soon thereafter; the entire program is expected to be completed by May, 1954.

Executive Changes at Firestone

Joseph A. Meek has been appointed director of industrial relations at Firestone. He previously had been general factory manager of the company's plant in Memphis, Tenn., since October, 1951, and before that time had been assistant director of industrial relations in Akron (1946 to 1951).

Paul Borda, general manager of the Firestone operated Ravenna Arsenal, Inc., for the past two years, replaces Mr. Meek as general factory manager at Memphis.

Mr. Meek joined Firestone in the cost department in 1925; was transferred to the time study department in 1926; in 1928 moved to Los Angeles to establish the industrial relations department at the newly established Firestone subsidiary plant there; then served as production manager at this plant until 1942; next was transferred to the Nebraska Defense Corp., a bomb-loading plant operated by Firestone in Fremont, Neb., and in 1943, was appointed general manager of the plant. In 1944, Mr. Meek was granted a leave of absence from Firestone to serve as Deputy Field Director of Ammunition Plants, U. S. Army Ordnance. In this capacity he served as Chief Civilian Adviser to the U. S. Ordnance Department directing the operation of the more than 60 shell- and bomb-loading plants in the country. At the end of World War II, Mr. Meek received the War Department Exceptional Civilian Service Award for his outstanding work as Deputy Field Director of Ammunition Plants. In 1945 he returned to Akron as assistant director of industrial relations.

Mr. Borda started with the company in Akron in 1920 as dispatcher in the maintenance department; in 1925, became foreman of the final inspection department; in 1928, was named department manager of final inspection; and in 1938, became production superintendent of Plant 2 in Akron. From 1942 to 1945, Mr. Borda was assigned to the Nebraska Ordnance Plant and became its General Manager in 1944.

J. H. Henderson has been named district manager for the San Francisco, Calif., district of The Firestone Tire & Rubber Co. Joining the coast division of the company in 1929, Mr. Henderson became service manager of the Riverside, Calif., store in 1933 and later served as manager of company stores in Brawley, Calif., and Tucson, Ariz. In 1941 he was made store supervisor for the Los Angeles district; in 1945, assistant district manager and then Phoenix, Ariz., district manager, and in 1950, Los Angeles district manager.

Herman A. Polser has been appointed Peoria, Ill., district manager. He joined the sales training program of the company in the Des Moines, Iowa, district in 1943. In 1944 he became a territory salesman; in 1945, store manager of the East Des Moines store; in 1946, manager of dealer sales for the district; and in 1949, store supervisor.

Trucking Industry Anniversary

Special covers bearing the first day's issue of the commemorative stamp authorized by the United States Government in recognition of the fiftieth anniversary of the trucking industry were recently mailed to truck operators and all Firestone truck tire dealers. Contained in the covers, illustrated with the "Ship by Truck" emblem balanced with the company's mark of quality outline and slogan, were messages from H. S. Firestone, Jr., and H. D. Tompkins describing Firestone's past contributions to the founding of the industry.

Employe Suggestions Rewarded

The workers of this nation have received approximately $7,000,000 over the past year as a result of employe suggestion systems, according to the National Association of Suggestion Systems. This figure, representing an increase of about $1,000,000 over that for the previous 12-month period, was arrived at from reports of 189 member companies and government agencies which employ more than 5,000,000 persons.

Well over a million suggestions were considered, with more than 260,000 of these ideas accepted and returning cash awards to the originators. This number of adopted suggestions shows an increase of 17% over those accepted during the last period. The average amount of the awards rose to a new high of better than $26. One of the largest awards made for a given suggestion was $2,500, paid an employe of Goodyear Tire & Rubber Co. at Topeka, Kan., for submitting a new type of roller device for plying gum strip to the edge of tire fabric.

The Association recently held a convention in Pittsburgh, Pa., at which time this information was released. President of the group is A. W. Egner, Swift & Co. Chairman of the public relations committee and a director of the Association is J. W. Hendershott, suggestion manager for Goodyear.

Relocates Manufacturing Plant

Sinclair & Valentine Co., New York, N. Y., has moved its facilities for the manufacture of dispersed rubber and plastic colors from New York to Ridgway, Pa. The new plant under the management of T. G. Sullivan, will produce approximately three times the volume of colors formerly produced. Sales agent for these products in Akron is Harwick Standard Chemical Co.

George Cohen, Naval research laboratory chemist, has joined the staff of the Frederick S. Bacon Laboratories, Watertown, Mass., as an organic chemist.

Exterior Masonry Paint

Water-dispersed Lustrex styrene, a product of Monsanto Chemical Co., Springfield, Mass., is currently being used as the solids vehicle in exterior masonry paint manufactured by Benjamin Moore & Co. This styrene latex system, which has been employed successfully in the same capacity in interior coatings, reportedly permits the non-oxidizing paint to dry quickly to a hard, waterproof film.

Application of this type of coating to surfaces of stucco, concrete, and brick have been successful, even when applied on to recent construction, since the paint is not saponified by alkalies. It is further claimed that the paint, when formulated with casein, exhibits resistance to color fading and to mildew formation.

Plastics Division Changes

The establishment of a new product sales group for polyethylene resins, with Edmund S. Childs as sales manager, was announced December 14 by the company's plastics division.

In making the announcement, R. C. Evans, general manager of sales, said that the move was in anticipation of the start-up, late this year, of the company's first polyethylene production unit.

Childs, who spearheaded the company's product development work on polyethylene since early 1953, since 1948 was assistant manager of product development for the division. He started with the division in 1940, as a sales trainee. In 1941 he transferred to the New York office as sales representative for Vuepak and in 1942 became assistant superintendent of maintenance and construction at the company's Merrimac Division plant in Everett, Mass. Childs rejoined the plastics division at Springfield in 1945, in the product development group. A member of the Society of Plastics Engineers, Childs is president and a director of its Western New England Section. He also belongs to the Society of the Plastics Industry and the American Chemical Society.

Four men have been promoted from sales trainees to sales representatives for Monsanto's plastics division: E. H. French, Alfred E. Pigeon, Arthur J. Raiche, and Wilbur M. Swan.

French will service Ultron vinyl film accounts out of the division's New York, N. Y., office. Pigeon will handle similar accounts, with headquarters at Springfield. Raiche and Swan will transfer to the Chicago sales office, where Raiche will service Lustrex styrene customers, and Swan will handle the sale of sheets, Vuepak cellulose acetate, and Ultron vinyl film.

Hewitt in England

Hewitt-Robins, Inc., Stamford, Conn., has concluded an agreement with Greengate & Irwell, Manchester, England, under which the latter will manufacture special types of conveyor belting and other heavy-duty industrial rubber products, including petroleum industry hose, according to Hewitt-Robins specifications and production suggestions. A subsidiary, Hewitt-Robins (Great Britain), Ltd., will be created to handle export sales from England; while G & I will handle sales in the British Isles.

A. F. Carr, formerly with Non-Breakable Button Co., is now with Hawkeye Rubber Mfg. Co., Cedar Rapids, Iowa.

nt

, a prod-
ringfield,
he solids
manufac-
This sty-
een em-
pacity in
mits the
ly to a

g to sur-
ick have
d on to
it is not
claimed
h casein,
and to

uct sales
ith Ed-
was an-
ompany's

R. C.
said that
he start-
y's first

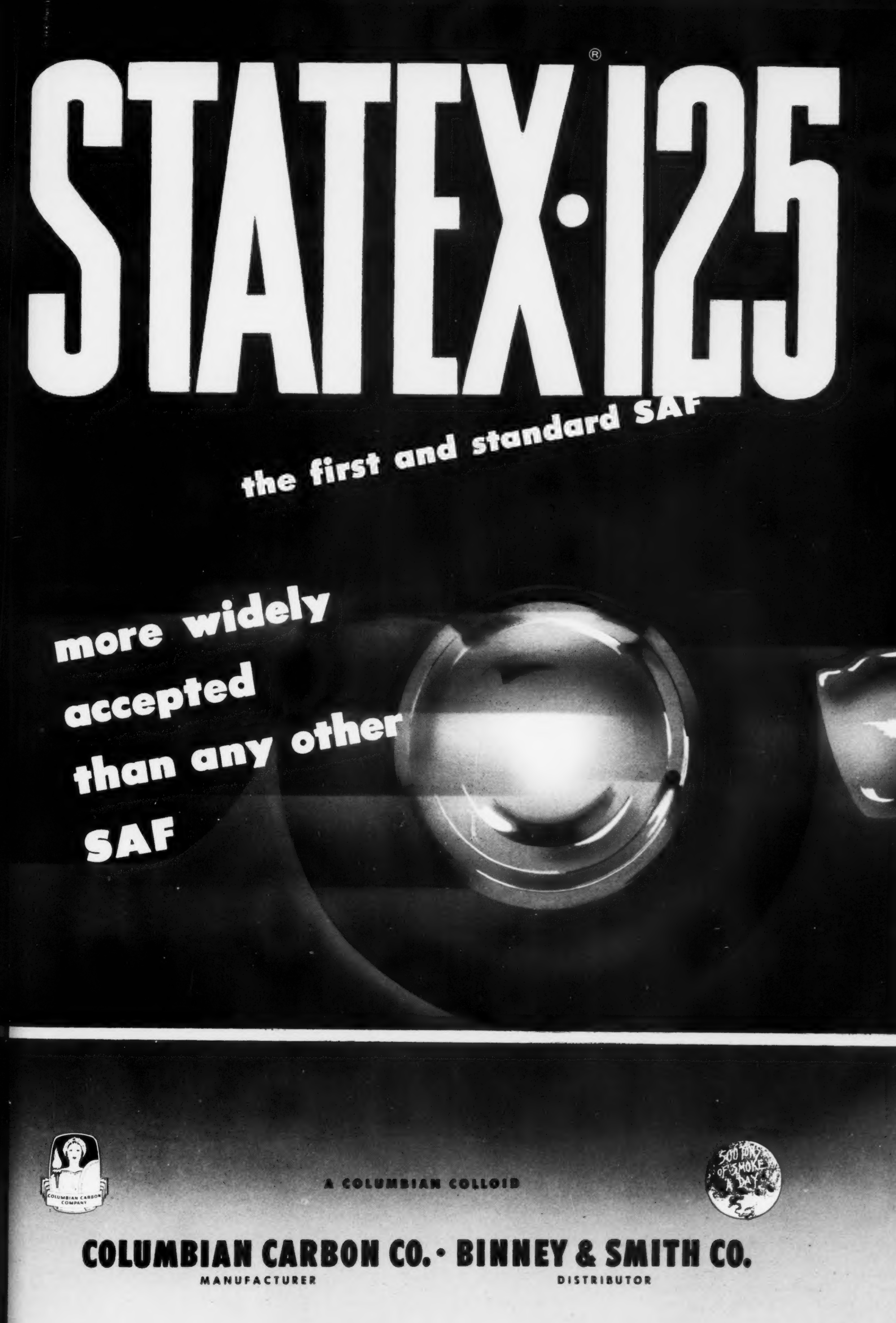
ompany's
ethylene
assistant
for the
ision in
e trans-
ales rep-
became
ance and
Merrimac
hilds re-
ringfield
t group.
tics En-
director
ion. He
Plastics
ical So-

om sales
or Mon-
French,
he, and

nyl film
v York,
similar
ingfield.
the Chi-
service
van will
cellulose

Conn.,
Green-
l, under
special
heavy-
ncluding
ing to
produc-
Hewitt-
created
l; while
sh Isles.

-Break-
awkeye
owa.


STATEX®-125
the first and standard SAF
more widely accepted than any other SAF
COLUMBIAN CARBON COMPANY
A COLUMBIAN COLLOID
500 TONS OF SMOKE A DAY
COLUMBIAN CARBON CO. · BINNEY & SMITH CO.
MANUFACTURER
DISTRIBUTOR

SAF (Super Abrasion Furnace)

STATEX®-125

HAF (High Abrasion Furnace)

STATEX-R

MPC (Medium Processing Channel)

STANDARD MICRONEX®

EPC (Easy Processing Channel)

MICRONEX W-6

FF (Fine Furnace)

STATEX-B

FEF (Fast Extruding Furnace)

STATEX-M

HMF (High Modulus Furnace)

STATEX-93

SRF (Semi-Reinforcing Furnace)

FURNEX®

COLUMBIAN CARBON CO. · **BINNEY & SMITH CO.**

MANUFACTURER · DISTRIBUTOR

New Cyanamid Set-Up

American Cyanamid Co., 30 Rockefeller Plaza, New York 20, N. Y., recently reorganized its development functions. Under the new organization there will be three departments: the fiber development department, with C. W. Bendigo as manager; the market research department, with Borden R. Putnam, Jr., as manager; and the new product development department, with Nolan B. Sommer as manager.

Mr. Bendigo will supervise commercial evaluation of experimental textile fibers developed by the company. These, so far, have included acrylic fibers all known by the experimental designation, "X-51."

Mr. Putnam will supervise market surveys to determine the advisability of plant expansions, product diversification, and development of new products, as well as long-range studies on development of new raw materials, processes, and products.

Dr. Sommer will be in charge of the development of markets for new products available from the firm's research laboratories and pilot plants.

Adhesive Company Expands

Rapid acceptance of the sealing compounds and adhesives manufactured by Permalastic Products, Detroit, Mich., has necessitated construction of two plants on a nine-acre site within that city. The first of the structures has been completed. A total manufacturing area of approximately 20,000 will be available upon completion of the project.

The firm manufactures adhesives of both the solvent and latex types, the largest single type of which is used for installing metal and plastic wall tile. Permalastic also produces a rubber-based coating compound for enveloping car seat and bed springs with a dampening and reinforcing film, such film eliminating the use of burlap cord for wrapping and tying upholstery springs of this type.

According to Sales Manager R. C. Chilton, a considerable amount of the company's material has been shipped to Italy for the automotive market there.

Burgess Pigment Continuing

Malcolm S. Burgess, president of Burgess Pigment Co., 64 Hamilton St., Paterson 1, N. J., has stated that the sale of Burgess Chemical Co. to a new group of stockholders will not affect the Pigment company in any way. It is felt, however, that this sale will enable the latter concern to give better and more efficient service.

Mr. Burgess further reports that his company will continue to market Burgess Antisun Wax.

The firm has also made two important changes in its sales staff. John D. McAleer has been appointed sales manager, and Robert M. Thibadeau, assistant sales manager.

Cabot Representative

Godfrey L. Cabot, Inc., Boston, Mass., has appointed B. F. Wagner & Co., 186 N. Vernon Ave., Pasadena 3, Calif., as representative for sales of wollastonite to the ceramics industry in that state. The material, a calcium metasilicate, is recommended for use as a white pigment in bodies, glazes, enamels, and frits.

Rubber Bonding Process

A process for bonding nitrile rubber and neoprene to Zamac materials, white metals (including aluminum), and nylon has been announced by Minnesota Rubber & Gasket Co., Minneapolis, Minn. The rubber-to-metal process is being used in the manufacture of phonograph drive wheels; while the nylon bonding technique is expected to eliminate the need of metal inserts where nylon is used as a bearing for rubber parts.

Goodrich Report on Mud-Snow Tires

In early 1950, one week after the National Safety Council conducted a series of tests on mud-snow tires at Pine Lake, Wis.,[1] the Pittsburgh Testing Laboratories are reported to have made similar tests at the same location on the mud-snow tires of The B. F. Goodrich Co. Results of this test, published in late 1950[2] by the tire manufacturer, shows the Goodrich products to be superior by a wide margin to conventional tread tires and to mud-snow tires of other manufacturers.

A recent NSC report, however, contains data apparently collected over the past few years which show the average of the mud-snow tires tested to be only 3.3% superior to conventional tread tires for stopping on glare ice and 12.9% better for stopping on hard packed snow.[3]

In view of the national distribution of this and other pamphlets by NSC, Goodrich recently released a "Special Report on Winter Driving Tests," which is again based on the data collected by the Pittsburgh Laboratories in 1950. Contained herein are figures showing that Goodrich mud-snow tires require 36.8% less distance to stop on glare ice and 32.2% less distance on hard packed snow than do tires of conventional tread. Furthermore, this report represents NSC data as showing only a 5% improvement in mud-snow tires over conventional tires in traction ability; while the Pittsburgh data indicate a 150% improvement for Goodrich products over conventional tires in this respect. Also, NSC reportedly states that the traction ability of the average of the mud-snow tires tested on hard packed snow is only 24% superior to that of conventional tread products; while Pittsburgh places Goodrich tires 110% better than the conventional tread tires.

Broken down into a comparison of Goodrich mud-snow tires *versus* the mud-snow tires of all manufacturers combined, the tire company claims an advantage of 34.3% for stopping ability on glare ice; 22.2% for stopping ability on hard packed snow; 138% for traction ability on glare ice; and 62% for traction ability on hard packed snow.

[1] "What about Special Tires for Winter Driving." For the conclusions of this report and industry's comment on it, see India RUBBER WORLD, Dec. 1951, p. 332.
[2] *Ibid.*, Dec., 1950, p. 340.
[3] "Here Are Winter Facts for Passenger-Car Drivers." Winter 1953-54 Edition. National Safety Council, Chicago, Ill.

Cyril Wright has been made manager of office and salary administration of The Firestone Tire & Rubber Co., Akron, O., where he started in 1919. His experience includes the accounting, financial, sales, and administrative fields and three years in Singapore with the rubber purchasing department.

Midwest's New Film on Reclaim

Representatives of the rubber industry in the New York area were treated to a showing of a new color film, "Behind the Scenes," depicting the processing methods being employed by the Midwest Rubber Reclaiming Co., East St. Louis, Ill. This showing took place at a luncheon in the Waldorf-Astoria Hotel, New York, N. Y., December 1. Hosts at the affair were William Welch, president of Midwest, and J. M. Ball, eastern representative of the firm.

The 30-minute movie, produced as a sequel to an earlier film called "Rubber Reborn," traces the various steps in the manufacture of blended slabs, sheets, and powdered reclaim from rubber scrap. The "chemical method," involving preparation, digestion, and milling operations, and the "mechanical method," involving removal of the cotton fiber by mechanical rather than chemical means, are covered in detail. Also pictured are some of the research facilities employed by the company at its East St. Louis location which attempt to keep production methods abreast of changes in the composition and processing of rubber products that some day will be scrap.

Styrene Sealing Process

Molded styrene containers are reported capable of being hermetically sealed by a patented process employing equipment available from Hermetic Sales Co., New York, N. Y. Called the Spielman Sealing Method, it involves insertion of a rubber ring, or washer, in the package cover; pressing the body of the filled container into the washer by means of a perforated turning wheel; and welding the cover to the body in 12 places. The resulting container is described as liquid- and air-tight and as ideally suited for storing food, chemicals, pharmaceuticals, etc. Opening of the sealed unit can be accomplished with a pointed instrument at no damage to the parts. A production rate of 1,800 containers per hour is reported at present installations which use the sealing equipment.

Low-Temperature Chamber

The Sub-Arctic line of low-temperature industrial chambers is now available in five standard sizes from Tenney Engineering, Inc., Newark, N. J. The work space for the models range from 1-12 cubic feet and can achieve temperatures from —40° down to —170° F., using "safe" Freon refrigerants. Those units designed for the lowest temperatures are equipped with compressors; all chambers can be equipped with program controls which automatically cycle temperatures according to preset conditions. The company had previously also standardized its altitude chamber, humidity chamber, and dry-ice type of low-temperature chamber.

Newman in New Post

James J. Newman, recently retired vice-president of The B. F. Goodrich Co., has been appointed consultant to the Secretary of the Treasury, Secretary Humphrey announced recently. Mr. Newman will serve as assistant to the National Director of the U. S. Savings Bonds Division, Earl O. Shreve.

Reorganizes Department Set-Up

To provide a more complete and specialized service to customers of friction, gasket, and packing materials, the industrial division of Armstrong Cork Co., Lancaster, Pa., has formed one new department and consolidated two others.

A new friction materials department has been formed to handle the division's growing opportunity and expanded sales effort in the fields of power transmission and power braking. Ralph M. Hill, former department manager for cork and rubber products, is in complete charge of development and sales work for the new department.

The cork and rubber products and the cork products departments have been merged to form the gasket and packing department. C. B. Grove, department manager for cork products, has assumed sales responsibility for all gasket materials—cork composition, cork and rubber, synthetic rubber, Accopac, and felt.

According to Armstrong, consolidation of the two departments under one manager will result in a coordinated and uniform approach to all gasketing activity. In addition, the company feels that the move will prove helpful in developing overall research and advertising programs.

Join Hooker Research Staff

Two new chemists have been added to the resins and plastics group of the research and development department of Hooker Electrochemical Co., according to J. H. Bruun, director of research and development.

Samuel J. Nelson, prior to coming to Hooker, had worked on the preparation and application of polymers at United States Rubber Co. and was active in organic process development at Atlantic Refining Co.

John E. Wier was in the U. S. Army from 1941 to 1946; then he was a general physical scientist in the organic plastics section of the National Bureau of Standards. Mr. Wier is the author of several scientific papers, particularly relating to polyester resin laminates.

4-Vinylpyridine Production

Reilly Tar & Chemical Corp., Indianapolis, Ind., has begun to manufacture commercial quantities of 4-vinylpyridine, a polymer and copolymer forming chemical compound. These polymers have a higher melting point and are less soluble in organic solvents than those formed of 2-vinylpyridine.

Suggested applications for the material are in formulations for bonding rubber; in some synthetic fibers to improve their dyeing characteristics; and in various chemical processes as an intermediate.

TMTD Accelerator Available

The availability of continuous supplies of TMTD tetramethylthiuram disulfide, a material used in rubber compounding as a primary and secondary accelerator, especially for products required to be odorless, tasteless, and non-toxic, has been announced by J. M. Baird Co., New York, N. Y. TMTD, Type 714, is imported by Baird from Chemische Fabriek Aagrunol, Groningen, Netherlands.

New Polyethylene Plant

Completion and full-scale operation of a new plant in Texas City, Tex., for the production of polyethylene at a rate in excess of 60,000,000 pounds a year has been announced by Bakelite Co., New York, N. Y. This volume of production will reportedly increase current manufacture of the plastic by 45%.

The first completed of a three-plant program for production of this material, the Texas City facility will be supplemented with units in Seadrift, Tex., and in Torrance, Calif. Operation of these units, expected by mid-1954 and 1955, respectively, will yield quantities of approximately 60,000,000 pounds annually for each location. All polyethylene facilities have been or are being built and operated by Carbide & Carbon Chemical Co., another division of Union Carbide & Carbon Corp.

Releases Chloro-IPC Name Rights

The brand name "Chloro-IPC," used by the Columbia-Southern Chemical Corp., Pittsburgh, Pa., to denote isopropyl-N (3-chlorophenyl) carbamate, has been released for use as a generic designation for the chemical. Used as an herbicide to control grasses and weeds on southern cotton plantations, the material has been widely accepted by the public, according to the company, such acceptance making possible this release of the name rights of the product.

Lockwood Leaves Natural Rubber Bureau; Bugbee New President

Warren S. Lockwood resigned as president of the Natural Rubber Bureau, Washington, D. C., on December 31. H. C. Bugbee, vice president of the Bureau, became the new president on January 1.

Mr. Lockwood is reestablishing, at 1417 K St., N. W., Washington 5, D. C., the international public relations firm of Warren S. Lockwood Associates, previously known as W. S. Lockwood, Inc. This organization, which specialized in world trade relations, was dissolved when Mr. Lockwood became president of NRB three years ago. The new organization will again be retained by the Bureau as consultant in all of its activities.

Beyond the elevation of Mr. Bugbee to president of the Bureau, there will be no change in staff or function of the organization, which represents the natural rubber growers of Malaya in the United States.

Mr. Lockwood left on a two-month around-the-world trip on January 1, during which he will visit all the major capitals of southeast Asia. He will discuss with government and business officials in these areas the best means of bettering their economies through sales of national products and commodities in the American market and will also look for markets for American products.

Mr. Bugbee was with The B. F. Goodrich Co. for 13 years, then was in charge of rubber sales for Rubber Reserve Co., and later was commodities attaché at the United States Embassy in London. Since 1947, he has been associated with Mr. Lockwood, first in W. S. Lockwood, Inc., and then as vice president of the Natural Rubber Bureau.

Polyvinyl Butyral Output Up

Plans to expand the production of polyvinyl butyral resin, the second such expansion for this material in less than a year, have been announced by Shawinigan Resins Corp., Springfield, Mass. The capacity increase of approximately 20% is expected to enable the plant to meet the demand anticipated for the next three years. It is possible that the new capacity will be maintained on a stand-by basis at times, according to the company, but the increase will permit filling the needs of the automobile industry, Shawinigan's biggest customer, at cyclical peaks of demand.

The new facilities are expected to be producing by April of this year. Monsanto Chemical Co., joint owner of the resin firm with Shawinigan Products Corp., recently expanded the Springfield plant of its plastics division for converting the resin to film. This film is used as an interlayer in the laminated safety glass for automobile windshields and windows.

Diamond in Atomic Electricity

The Atomic Energy Commission has approved the addition of the Diamond Alkali Co., Cleveland, O., to the study team of Foster Wheeler Corp. and Pioneer Service & Engineering Co. for the purpose of increasing the activities of the team in the Commission's nuclear reactor development program for the application of atomic energy to electric power generation. The latter two firms have been involved in this phase of the peaceful utilization of atomic energy for some time; the acceptance of Diamond as the chemical partner follows the original planning of the team to have companies with diversified experience concerned with this problem.

Claims Production Record

The completion of three months of production of "Foamtread" footwear without a single pair of seconds or rejects has been announced by a French affiliate of Wellco-Ro-Search, Inc., Waynesville, N. C. This achievement, believed by company officials to be a new production record for any factory, was realized at an average monthly rate in excess of 150,000 pairs.

Basic Materials Exposition

The second Basic Materials Exposition & Conference will be held in the International Amphitheatre, Chicago, Ill., May 17-20, 1954, according to an announcement from the producer, Clapp & Poliak, Inc., New York, N. Y. The Exposition presents an opportunity for manufacturers of basic materials to display their products; while the Conference running concurrently with the Exposition, features addresses directed toward men involved in product development.

The space available to exhibitors will be double that available at the first Exposition,[1] and the number of companies expected to participate will be increased by about 50%. Sponsoring the show is a group of more than 20 executives of important companies headed by D. G. Mitchell, chairman of the board of Sylvania Electric Products, Inc.

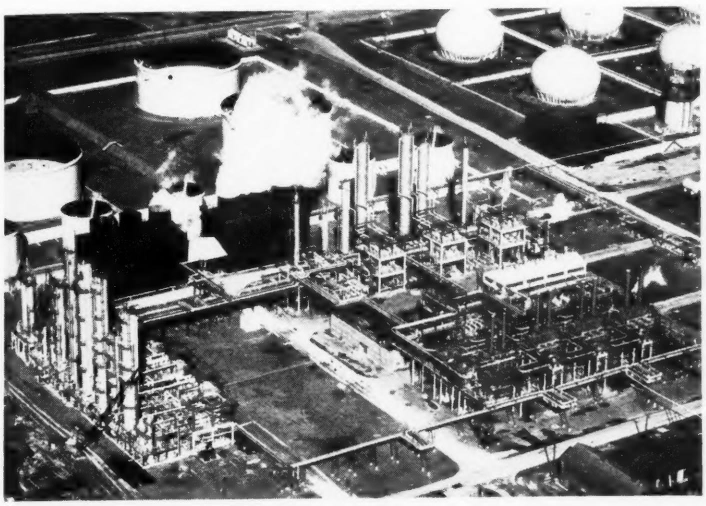
[1] For a report on the first show, see INDIA RUBBER WORLD, July, 1953, p. 512.

Opens Petrochemicals Plant

Sun Oil Co., **Philadelphia, Pa.**, unveiled its new $15,000,000 petrochemicals plant, located at its refinery in Marcus Hook, Pa., with a press conference and plant tour on December 2. According to C. H. Thayer, vice president in charge of manufacturing, the new plant is designed to produce annually as much as 19,000,000 gallons of benzene, the same quantity of toluene, and 15,000,000 gallons of mixed xylenes (including ethyl benzene). High-purity hydrogen will be produced as a by-product at the rate of 13,500,000 cubic feet a day. The plant design incorporates a high degree of flexibility so that the relative proportions of the three major products can be varied in accordance with market demand. In addition, the plant can also be used for up-grading the octane number of gasoline and for the production of aviation gasoline blending stocks.

A complicated maze of steel tanks, reactors, piping, valves, and instrumentation covering 20 acres, the plant provides for three continuous processing steps, as follows: (1) the superfractionation of selected feed stocks from crude oil and natural gas; (2) reforming the fractionated stock at temperatures over 900°F., using a platinum catalyst; and (3) purification by a solvent process and further superfractionation. The reforming process, called the Houdriformer, comprises the major portion of the plant and uses the Houdry Process Corp. method adapted to the manufacture of aromatics with the help of Sun Oil engineers. The purification step is largely handled by the Dow Chemical Co.-Universal Oil Products Co. process under license by the latter firm.

The new plant is a major step in a series Sun Oil has taken into the petrochemicals field. The company already is a major producer of propylene trimer and tetramer and also manufactures sulfonates and a new type of naphthenic acid.



Aerial View of Sun Oil Co.'s New Petrochemicals Plant

Shell Chemical Expanding

Shell Chemical Corp., 50 W. 50th St., New York 20, N. Y., is erecting a new plant at Norco, La. Work on the allyl chloride and chlorohydrine producing facility is scheduled to start immediately, and completion is expected late this year. The products will be used in making glycerin, epichlorohydrin, and Epon resins.

Ammonia Plant Opened

The second anhydrous ammonia plant of Shell Chemical was formally opened last month at Ventura, Calif., by the company's president, R. C. McCurdy. Cost of the facility, which is situated on a 27-acre tract of land and which employs 140 people, is estimated at $10,000,000. Production from this unit, placed at 150 tons per day, will complement that of the Pittsburg, Calif., plant in supplying the demand of western agriculture and industry for this chemical.

Paul Uhlich & Co., Inc., 90 West St., New York 6, N. Y., has appointed W. D. Anderson and H. B. Headley, of Summit Chemical Co., Akron, O., as sales representatives for the pigment colors manufactured by Uhlich.

Authorizes Stock Increase

Shareholders of The General Tire & Rubber Co., Akron, O., in a special meeting in Akron on December 3 authorized an amendment to General's charter permitting the issuance by the board of directors of a new class of preferred stock in the amount of $35,000,000. This authorization was for the setting up of a new class of 350,000 preferred shares at a par value of $100 a share.

W. O'Neil, General's president and board chairman, announced that no plans had been formulated for the issuance of the stock at this time.

"The shareholder action gives the board of directors an opportunity to capitalize on business developments in the future," Mr. O'Neil said. "We could now protect the company's best interest by availing ourselves of favorable market conditions as well as providing for plant improvements, new developments, and expansion if and when advisable."

Mr. O'Neil told the shareholders present that General's sales for 1953 will be approximately $210,000,000, the greatest in the company's history. Mr. O'Neil also announced that the next directors' meeting will be held January 19, at Waco, Tex., the first directors' meeting ever to be held outside of Akron. It will commemorate General's tenth anniversary in Texas.

Gow President of Seamless

Arthur R. Gow on December 10 was named president of the Seamless Rubber Co., New Haven, Conn., succeeding F. Thatcher Lane, now chairman of the board.

Mr. Gow, executive vice president since 1950, previously had been vice president and factory manager. He had started with Seamless on January 1, 1929, following a brief period with Hood Rubber Co. at Watertown, Mass.

Mr. Lane was president of Seamless since 1933, having a record with the company of more than 34 years.

At the same time, announcement was made of the promotion of William B. Watson to the position of vice president and factory manager. He had been assistant vice president and factory manager since April, 1952. He began as a trainee at Seamless in 1946 and held various production assignments until his appointment as factory manager in 1950.

Arthur R. Gow

IEEM Election

The Institute of Environmental Equipment Manufacturers, 30 Church St., New York, N. Y., an organization whose members include producers, suppliers, and users of equipment used to simulate rain, cold, heat, altitude conditions, etc., has announced the election of the following officers: M. Seligman, Tenney Engineering, Inc., president; C. M. Shelburn, Webber Mfg. Co., executive vice president; and R. S. Jamison, of Sub-Zero Products, A. J. Deeb, International Radiant Co., and D. H. Leatherman, Bemco, Inc., as vice presidents for various divisions.

The IEEM also announced plans to compile a handbook of all available data in this field, and to publish "Proceedings of the IEEM" and the *Environmental Quarterly.*

Preco, Inc., manufacturer of the Preco bench-type hydraulic press, has sold all rights, including engineering, patents, and tooling, to Pasadena Hydraulics, Inc., Pasadena, Calif. Production of the Preco line, to which has been added a larger model press, has begun in a new plant of the latter firm.

Chemical Industries Show

The twenty-fourth Exposition of Chemical Industries, the largest in the series, was held November 30 to December 5 in the Commercial Museum and Convention Hall, Philadelphia, Pa. This marked the first time the show had not been held in Grand Central Palace, New York, N. Y., and both exhibitors and visitors hailed the single-floor layout as a great improvement over the multi-story, stair-climbing arrangement of the Palace. Approximately 32,300 visitors attended the show, which consisted of more than 550 exhibits covering nearly five acres of space.

As in the past, the show covered all aspects of the chemical process industries with some 240 different classifications of displays on materials, equipment, and applications. Rubber and plastics were very much in evidence in applications requiring chemical or corrosion resistance, as in containers, packings, piping, valves and fittings, fume hoods and ducts, etc.

Chemical exhibits included plasticizers and resins by Atlas Powder Co.; solvents by Commercial Solvents Corp.; fatty acids and plasticizers by Emery Industries, Inc.; cellulosics and rosin products, Hercules Powder Co.; plastics, W. M. Kellogg Co.; monomer resin products by Monomer-Polymer, Inc.; chemicals, plasticizers, and plastics, Monsanto Chemical Co.; stabilizers and gelling agents, National Lead Co.; plasticizers by Oronite Chemical Co.; chemicals and resins, Reichhold Chemicals, Inc.; oils and plasticizers, Socony-Vacuum Oil Co.; and chemicals, Victor Chemical Works.

Fabricated plastics in the form of rigid vinyl pipe and fittings were shown by Alpha Plastics, Inc.; Colonial Plastics Mfg. Co.; and Van Dorn Iron Works Co. Flexible vinyl products were exhibited by U. S Stoneware Co., and vinyl pipe identifiers were featured by Wilmington Plastic Sales Co. Other stands included fluorocarbon and vinyl acetate plastics by Resistoflex Corp., and polyethylene bottles and carboys by Plax Corp.

Other displays of interest in the product field were rubber, plastic, and other types of packings shown by Garlock Packing Co. and Raybestos-Manhattan, Inc.; mineral insulations and linings exhibited by Johns-Manville Corp.; the C. P. Hall Co. of Illinois display of rubber drums made by The General Tire & Rubber Co.; and the full line of hard rubber products shown by American Hard Rubber Co.

Of the hundreds of machinery and equipment displays, special attention was merited by the following: lead-lined equipment, National Lead; mixers, Baker Perkins, Inc.; swivel joints, Barco Mfg. Co.; processing equipment, including quick-opening vulcanizer doors, Blaw-Knox Co.; steam generators, Combustion Engineering, Inc., Eclipse Fuel Engineering Co., and Orr & Sembower, Inc.; automatic weighing and batching equipment, Buffalo Scale Co., Inc., Exact Weight Scale Co., Thayer Scale & Engineering Co., and Toledo Scale Co.; and the interesting displays of instrumentation by American Instrument Co., Inc., Cambridge Instrument Co., Inc., Foxboro Co., Taylor Instrument Cos., and Wheelco Instrument Division of Barber-Coleman Co.

Lilienthal Speaks at Dinner

A feature of the opening day of the Exposition was a dinner sponsored by the Philadelphia Section, American Chemical Society, held in the Convention Hall ballroom. Some 800 visitors to the show attended the dinner and heard David E. Lilienthal, of Attapulgus Minerals & Chemicals Corp. and former chairman of the Atomic Energy Commission and the Tennessee Valley Authority, speak on "Industrialism and the American Future." The speaker was introduced by Crawford H. Greenewalt, president of E. I. du Pont de Nemours & Co., Inc.

Mr. Lilienthal said that America's industrial growth is far too healthy for the country to be acting like an economic hypochondriac; he termed the Exposition a striking demonstration of what's right with America. As for the future, the speaker forecast the creation of a new type of society, a democratic industrialism that will emerge with the help of the chemical industry to further the development of both industrialism and the individual.

I & EC Lecture Series

An innovation at this year's Exposition that proved highly popular was a series of five lectures, one each day, on new developments and trends in different fields of the chemical industry. Sponsored by *Industrial & Engineering Chemistry*, the lectures were given by authorities who write regularly for the magazine, as follows: "Equipment and Design," David E. Pierce, consultant; "Instrumentation," Ralph Munch, Monsanto; "Corrosion," Mars G. Fontana, Ohio State University; "Materials Handling," Thomas W. Rodes, Carbide & Carbon Chemicals Co.; and "Safety," V. R. Croswell, Hercules.

Mr. Pierce noted that the modern trend in chemical engineering design is toward completely integrated units. Standardization of parts and the use of scale models are gaining in popularity, and equipment manufacturers are designing for abuse as well as use of their products.

Instrumentation in the process industries has brought increased production, more uniform product quality, lower costs, and greater safety, Mr. Munch declared. While the subject of automatic plants is widely discussed, such plants are now possible only for the simpler processes and then only if the definition of "automatic" is not too rigorous.

The cost of corrosion in this country is more than six billion dollars each year, according to Mr. Fontana, who suggested the following means of combatting corrosion: use of non-metallics where possible; designing metal parts with corrosion problems in mind; cathodic protection; use of resistant alloys and of protective coatings.

Materials handling development has not kept pace with other phases of industrial growth, according to Mr. Rodes. More attention by management is needed to develop improved handling equipment and techniques as a source of greater manufacturing efficiency.

Mr. Croswell stressed that sound engineering, good housekeeping, thorough maintenance, and healthy, alert personnel are essential for good safety. A safety program should have three parts: mechanical guards and personal protective equipment; correct safety attitudes by workers; and sharing of responsibility for safety by both management and employes.

Hercules Powder Co., Inc., Wilmington, Del., has moved its branch sales office in New York, N. Y., to 380 Madison Ave.

Glenn H. Crawford, at a recent board meeting of Dunlop Tire & Rubber Corp., Buffalo, N. Y., was elected executive vice-president and treasurer. Crawford joined Dunlop in 1927 and since 1946 has served as vice president and comptroller.

Improved Hose Manufacture

Mechanized production of curved radiator hose is now taking place at the new Marion, O., plant of The B. F. Goodrich Co., Akron, O. This production department, designed to permit manufacture at a rate to satisfy the demands of the foreseeable future, represents an investment of one-tenth the cost of the $2,500,000 hose manufacturing facility.

The new system of manufacture reportedly improves the quality of the product by reducing the amount of handling in the various production stages. Short lengths of uncured hose are placed on the curved mandrels mounted on plates and hooked together for automatic passage through vulcanizers on a roller conveyor system. Following removal of the hose after vulcanization, the conveyor returns to be reloaded while the product is transferred to another conveyor for movement to the next operation. Multi-decked conveyor-roll racks with automatic loading and unloading elevators are used to conserve floor space, and a gravity-feed system for transporting the product from the racks to the next operation is employed.

Lab for Rocket Propellants

Construction of a new laboratory, adjacent to the group of buildings comprising the Goodrich research center at Brecksville, O., has been completed, and basic research studies on rocket propellants are currently under way there, according to the company. An inspection team of government officials directly concerned with rocket projects recently toured the installation and met with Goodrich research personnel stationed at the Center.

Tubeless Tires Made for Planes

Tubeless tires for use on commercial airplanes are being manufactured by Goodrich, E. F. Tomlinson, vice president of the company's tire division, revealed recently. The new tires are lighter weight than conventional tire-and-tube combinations and can be warehoused and mounted with more ease than tires and tubes, according to Goodrich, which introduced tubeless tires for passenger cars in 1947.

The company announced the successful testing of tubeless tires for U. S. Navy aircraft on March 28.

Improved Yarn from Enka

The entire output of high-tenacity rayon tire yarn from American Enka Corp., New York, N. Y., is a new, improved type, according to a recent announcement from the company. Resulting from several years of research and collaboration with consumers of the product, the tire cord embodies processing changes and refinements designed to increase the strength and flexing endurance of the yarn; the former property reportedly is improved by approximately 10% in various cord constructions. The changeover to the new yarn was accomplished at both plants of the company late in October, 1953.

W. H. Olivarri has been appointed Houston, Tex., district manager for The Firestone Tire & Rubber Co., to succeed **C. L. Largent**, now eastern division manager for the company, with headquarters in New York, N. Y.

Sam DuPree

Herman R. Thies

Frank R. Evans

DuPree, Thies, Evans Promoted

Key appointments on the management level at the Goodyear Tire & Rubber Co., Akron, O., were announced last month by E. J. Thomas, company president.

Sam DuPree has been made general manager of all industrial products; while Herman R. Thies has been named general manager of all chemical products. Both are newly created positions.

The new organizational alinement grows out of the expanding volume of business of the industrial products and chemical divisions, Thomas explained.

At the same time he reported the promotion of Frank R. Evans as general manager of the shoe products division, succeeding Harry L. Post, who has retired.

DuPree, with Goodyear since January 1, 1934, for the past year has been assistant to Sales Vice President R. S. Wilson as liaison executive with four divisions of the company—industrial products, shoe products, chemical, and metal products. In his new position DuPree will coordinate and supervise all phases of Goodyear industrial products.

Thies, likewise, will assume full charge of the chemical division in all its phases. He has been manager of the division since it was organized in 1948.

Evans has been production manager of the shoe products division since 1936.

DuPree, on January 1, 1934, started on the company's production training squadron. After a few months he transferred to mechanical goods development; in 1939, was named development manager at the new molded goods plant at St. Marys, O.; in 1945, was made sales manager at St. Marys; and in 1947, returned to Akron as assistant manager of the industrial products division.

Thies joined Goodyear in 1930 as a rubber research compounder; in 1936, was appointed assistant director of research; in 1942, was advanced to manager of pliolite sales; and three years later was made head of the plastics and coating department.

Evans came to Goodyear on June 14, 1926, as a dispatcher in production control at Akron; became foreman in production control two years later; and in 1929 was sent to the new Goodyear-Australia factory as division superintendent. Returning to Akron in 1932, he was foreman in production control until being transferred to Windsor in 1936 as division superintendent. In 1944 he was made manager of factory sales service and in 1946, production manager of the shoe products division at Windsor.

After three years with the Diamond Rubber Co., Post joined Goodyear as a mechanical goods salesman in Cleveland in 1913. Manager of the shoe products division from 1917 to 1922, Post then resigned to become vice president in charge of sales for Seiberling Rubber Co. In 1932 he assumed the presidency of American Tire Alliance, Inc. Returning to Goodyear in 1936, he resumed his former position as manager of the shoe products division. Post played an important part in the development of Neolite.

Other Personnel Changes

P. W. Beggs has been appointed superintendent of Goodyear's Rockmart, Ga., textile plant, replacing the late E. A. Powell. Beggs previously had been superintendent of the firm's new synthetic fiber unit at Cartersville, Ga. He joined Goodyear in 1920 with its Southwest Cotton Co., then operating in central Arizona, and later was assigned various posts in the company's textile operations, becoming general superintendent of the California textile mill in 1929. He was named superintendent of Goodyear's Brazilian mill in 1939, but returned to the U. S. in 1950 to become assistant superintendent of the company's Decatur, Ala., mills.

K. A. Searles has been named technical service representative for Goodyear's all-purpose adhesive, Pliobond, and will work out of the Akron home office, supplying specialized technical service on the use of Pliobond for industrial applications and will assist distributors by providing technical and engineering information to customer accounts.

Joining the Goodyear organization in 1944, he spent five years in textile research. In January, 1951, Searles was transferred to the research department of mechanical engineering, staying in this capacity until April, 1952, when he entered the chemical division.

J. L. Roush, Airfoam field representative, Los Angeles, Calif., has been promoted to an important eastern territory in the New York, N. Y., area and will be replaced in Los Angeles by C. R. Keeney, from the Airfoam division in Akron.

Roush joined Goodyear in February, 1951, and in December of that year was appointed to the Airfoam division. He was made a field representative in 1952, transferring to Los Angeles that April.

Keeney has been with Goodyear since 1951, when he started as a member of the production squadron in Akron. He was made a staffman in the Airfoam division in 1952.

J. M. Bard has been assigned to the Airfoam sales staff. Bard has been with Goodyear since 1936 when he joined the organization in Miami, Fla. Later he was transferred to Jacksonville, Fla., and in 1941 became office manager for Goodyear in Savannah, Ga. He most recently was associated with the accounting department in Akron.

James M. Jones has been named to the South Atlantic sales territory of the chemical division. He will headquarter in Philadelphia and will service the plastic and rubber industries. As a specialist in the calendering, extrusion, and molding of plastic and rubber, Jones will provide technical service on Plio-Tuf resins and Chemigum rubbers. He joined Goodyear's training squadron in 1951 and later was assigned to the chemical division.

Charles S. Pyne has been added to the Midwest territory of the chemical sales division and will headquarter in Minneapolis, servicing the paper, paint, and coatings industries in Minnesota and Wisconsin. Pyne joined Goodyear's training squadron in 1951, was assigned to the chemical division in 1952, and continued training in the company's development laboratories.

John V. Brown has been promoted to sales representative in the Chicago headquarters. Brown, a former sales trainee, will specialize in selling chemical division products to the rubber and plastics industries. As a specialist in the use of rubber reinforcing resins, he also will provide technical service to plastic molders who use Goodyear's new plastic, Plio-Tuf. Brown joined the company in 1951.

Vinyl Flooring Output Up

An increase in the production of vinyl flooring has been announced by Goodyear. First introduced in 1947 and restyled by Raymond Loewy Associates in 1949, the line of floor tile has been in an oversold position for more than a year as a result of advertising and promotional campaigns.

Heckman-Eifrig Co., 3531 N. Clark St., Chicago, Ill., has been appointed distributor of rubber and vinyl flooring by Goodyear. Wescott Hindmarsh, Inc., of Chicago and Milwaukee, will continue as Goodyear flooring distributor; both companies will serve the Chicago trading area.

Mansfield Shifts Executives

The Mansfield Tire & Rubber Co., Mansfield, O., recently announced a realinement of its administrative staff, involving the following changes.

William M. Moser has been made assistant to the president, pairing up with Albert E. Barkett, who was named to a similar post in May, 1952.

Kenneth R. Garvick has been appointed assistant to H. P. Partenheimer, director of research and development. Garvick is in charge of compound development.

Robert C. Hudson now is also assistant to the director of research and development in charge of design and construction; while Paul L. Cairns has succeeded Hudson as manager of design and construction.

R. M. Gage has been assigned the position of manager of research, new products division, a newly created division in the research department.

Charles Skuza has transferred from Central Rubber & Mfg. Co. to Phoenix Mfg. Co., Joliet, Ill.

Harry B. Warner

Warner in New Post

Harry B. Warner is now vice president, technical, of B. F. Goodrich Chemical Co., Rose Bldg., Cleveland, O. Warner, formerly plant manager of BFG Chemical's Avon Lake, O., Experimental Station, will direct the company's technical and development activities from Cleveland. He joined The B. F. Goodrich Co. in Akron as a chemist in 1939 and in 1942 was made plant manager of the chemical company's Niagara Falls, N. Y., plant. Then, in 1948, after several special overseas assignments, Warner was made assistant to the vice president, manufacturing. Later in the same year he became Avon Lake Experimental Station plant manager. He is a member of the American Chemical Society and American Institute of Chemical Engineers.

Vittone to Manage Avon Lake Plant

On January 1, Anton Vittone, Jr., became plant manager of the Avon Lake Experimental Station. He comes from the Institute, W. Va., man-made rubber plant where he was plant manager. The Institute plant, operated for the government by BFG Chemical, is currently being put in standby condition by the company.

Vittone joined the BFG organization in 1942 as a shift foreman at the GR-S plant in Louisville, Ky., and in 1947 was transferred to the Geon polyvinyl chloride plastic resin plant there as a general foreman. He then held various assignments with the company here and abroad before being sent to Institute in 1950 as production manager. Vittone was made plant engineer a year later and in 1952 became plant manager. He belongs to the American Institute of Chemical Engineers and the American Chemical Society.

Vinyl Storm Windows

Vinyl plastic storm windows made of Goodrich Chemical's Geon resins are being manufactured by Clopay Corp., Cincinnati, O. Operating in a manner similar to that of a conventional window shade (i.e., contained on a spring roll and capable of pull up-and-down movement), the new product is installed by means of tension brackets, metal strips, and guide tabs to the inside of a window frame.

In this position an air pocket is formed between the plastic film and the glass pane which provides insulation for the room. In the rolled position, no interference with conventional window shades, curtains, or draperies is reported, and the roll itself is almost unobservable. Cost of the new product is described as a fraction of that of ordinary storm windows.

Seiberling Expanding

An official of Seiberling Rubber Co., Akron, O., announced December 17 that land will be acquired at Newcomerstown, O., about 60 miles south of Akron, for a new plant site.

H. P. Schrank, Seiberling's vice president in charge of production, reported that a one-story plant will be built on the land, a 12-acre tract on the eastern edge of the city.

Construction is expected to start soon, when legal details have been completed, Schrank said, and the company hopes to be in operation in the new plant "about midsummer of 1954." It will be the first new plant construction project outside Akron and Toronto for Seiberling.

The company manufactures tires and tubes, automobile mats and accessories at its Akron plant; while another unit, at Carey, O., produces heels and soles and other molded goods. Seiberling's Canadian subsidiary at Toronto makes similar lines, plus druggists' sundries.

Schrank said that Newcomerstown was selected for the new plant site because of its convenience to transportation, good water supply, comparatively untapped labor sources, and "excellent cooperation and interest by the city's officials and its Chamber of Commerce."

The organization of a new plastics division that is already in limited production on a pilot-plant scale has also been announced by Seiberling as its first major product diversification since World War II. Initially, the company will concentrate on the fabrication of rigid plastic material, main line of which will be unplasticized polyvinyl chloride sheeting, with special emphasis on a given property, such as tensile strength, chemical resistance, etc.

Raw materials, including powdered resin and compounding ingredients, will be purchased from chemical companies for conversion into film by means of reportedly new and previously untried methods. The sheeting will be sold to manufacturers for fabrication into special products, or will be processed by Seiberling into finished products not made by its customers. Quality rather than volume of production will be the criterion for the new division.

Although present work is being done in Seiberling facilities in Akron, the plastics division will occupy the new plant at Newcomerstown, it was announced the week following the report of the purchase of the site.

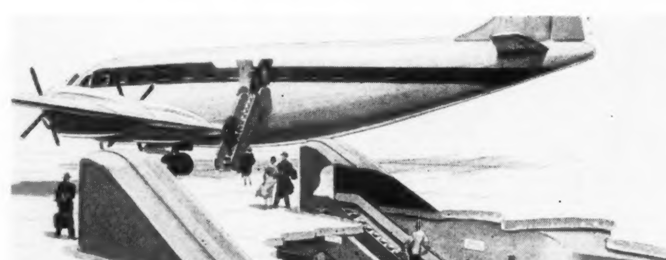
Conveyor Belt Cover

Resistance to abrasion and tearing never before attained has been promised for conveyor belts which employ a cover recently developed, according to Raybestos-Manhattan, Inc., Passaic, N. J. It is contended that the most important specification of a conveyor belt cover is its abrasive resistance and not its tensile strength which has long been overemphasized. On this belief, the company has developed the XDC Conveyor Belt Cover, manufactured by a "radically new blending of superior and improved ingredients." The product is recommended primarily for use in handling heavy, rock-like material where its advantages of long life, superior flexibility, and added resiliency may be fully exploited.

Passenger Conveyor Belts

Further uses of the basic idea for passenger conveyor belts have been developed by Goodyear Tire & Rubber Co., Akron, O. One modification of the original system intended for replacement of the Times Square-Grand Central Shuttle in New York, N. Y., has already been contracted for installation.[1] Meanwhile Goodyear and Stephens-Adamson Mfg. Co. are creating designs for passenger and baggage transport by belt in one of the world's largest airports; a plan for loading and unloading passengers by conveyor belt in railroad and bus terminals; a complete belt system for all transportation in a shopping center in the East; and a master design for handling foot traffic in any extensive parking area. Also under consideration are similar systems for places such as sport stadia where the continuous-flow principle of conveyor belts can solve congestion problems.

[1] The Speedwalk, connecting Erie Station and the Hudson & Manhattan Tubes in Jersey City, N. J. See India RUBBER WORLD, Nov., 1953, p. 240.



Sketch of Speedwalk Facilities Proposed for Air Terminals

HERE'S EXPERIENCE THAT CAN HELP YOU WITH YOUR PROCESSING

When you need a process aid or have a problem involving one, it will pay you to take advantage of Sun's technical knowledge and experience in the field.

As early as 1937, working with leading rubber companies, Sun made commercially available a petroleum derivative remarkably suited for plasticizing Neoprenes, natural rubbers and reclaims. This was followed by a number of other process aids—among them Circosol-2XH, an elasticator that greatly improved the rebound properties of GR-S synthetics; and Sundex-53, a low-cost product highly compatible with natural rubbers, GR-S, reclaims, and various combinations of the three. Leadership in the field and knowledge of the industry's requirements brought about Sun's participation in the experimental work which led to the development of oil-extended synthetic rubbers.

Put this experience, plus a complete line of products, to work for you—in lowering costs, in improving product quality, in solving processing problems. For the assistance of Sun's rubber technologists, write SUN OIL COMPANY, Dept. RW-1.

INDUSTRIAL PRODUCTS DEPARTMENT
SUN OIL COMPANY

SUNOCO

PHILADELPHIA 3, PA. • SUN OIL COMPANY LTD., TORONTO & MONTREAL

New Research Center

Plans for the construction of three buildings in Preakness, N. J., to house the research and development facilities of the United States Rubber Co., Rockefeller Center, New York 20, N. Y., have been announced. Options to purchase a 90-acre tract of land have been acquired as the first step in the development.

The location, overall appearance of which will suggest a university campus, will contain a main laboratory with 90,500 square feet of floor area, a chemical engineering laboratory with 8,500 square feet, and an experimental laboratory of 35,000 square feet of floor space. These structures, plus a garage and a power plant, are expected to cost approximately $4,000,000.

The new research center will employ nearly 400 people, many of whom are currently employed in the company's general laboratories in Passaic, N. J. The activities of the Passaic facilities in the fields of rubber, chemicals, textiles, and plastics will be transferred to the new location.

Personnel Promoted

James H. Purdy, Jr., has been assigned the newly created post of merchandise manager for consumer fabrics, textile division, U. S. Rubber. He will be responsible for the merchandising of all consumer fabrics manufactured by the division including denim, fancy and plain cottons, and the new Royal-O fabrics which are orlon-rayon blends. He will be headquartered in the division's consumer fabrics sales office at 1407 Broadway, New York. Mr. Purdy has been associated with the textile industry for more than 20 years. Until recently he was assistant manager of the synthetic fabrics department, Pacific Mills, Inc., in charge of styling and developing fabric lines. Prior to his work at Pacific, he had been with Deering Milliken, styling worsted and synthetic blends.

Norman S. Bernie has been appointed sales manager for consumer fabrics of the division and will be responsible for the sales of all consumer fabrics manufactured by the division. He too will be at 1407 Broadway. Mr. Bernie was formerly general manager of the trade mark department of Textron, Inc., and prior to that position had been in charge of Indian Head sales for Textron in Metropolitan New York.

J. J. Davison has been named manager of truck tire sales for the Fisk-Gillette tires division; while A. G. Richtmyer and R. P. Buis have been appointed district managers at Portland, Oreg., and Kansas City, respectively.

Mr. Davison, with U. S. Rubber for 20 years, has held many positions, most recently as Portland district manager. Mr. Richtmyer first joined the organization in 1936 and was district manager at Kansas City before his assignment to Portland. Mr. Buis, who succeeds Mr. Richtmyer, began with the company in 1935.

Plastic Truck Doors

Doors for insulated trucks are being fabricated by American Enterprises, Stamford, Conn., of Fiberglas and Naugatuck Vibrin polyester resin. The units are molded in a single pan-like section, impregnated with white pigment (for sanitary reasons), filled with insulation, and faced with a sheet of aluminum. The large, "walk-in" type of doors of this construction is claimed to weigh approximately 75 pounds when equipped with the necessary hardware, a figure described as less than half the weight of a comparable door of metal and wood. Frames for the doors are also being made of the same reinforced plastic material.

Major advantage of this construction is the greatly reduced swelling and shrinking characteristics of the product, a consequence of the low water absorption of the plastic. This permits door and frame to be molded with only 1/16-inch clearance, or less than half the usual clearance required for these items. Moisture build-up around the door edges, which often freezes the door to the frame, is materially reduced. Other advantages of the new doors are elimination of rotting, odor absorption, and damage from steam cleaning; easy cleaning; and resistance to damage from heavy impacts. Cost of the new doors is placed at 5-10% higher than that for doors of the conventional type.

Ensolite Protective Padding

Football players are being protected from the shocks of the game by knee, rib, and hip pads and by thigh and shoulder guards made of Ensolite, a cellular plastic material produced by U. S. Rubber. Professional, college, and high school teams are also using the shock-absorbent plastic on the inside and outside surfaces of helmets for the protection of the wearer as well as of the opposing players.

The new padding, honeycombed with millions of non-connecting air cells, is reportedly light in weight and resistant to absorption of moisture in any form. Fabricated into shaped form from sheets 48 by 72 inches in area and one-half or one inch in thickness, the protective pads can be distorted by a concentrated blow, but will return to shape without permanent deformation, it is further claimed.

Rubber Paving for Airports

A rubber paving material, reportedly unaffected by fuel spillage and impervious to water, has been installed as a topping on approximately 15,000 square yards of airplane parking and service areas at New York International Airport. Called Surfa-Aero-Sealz, the product consists of a blend of oil-resistant, plasticized synthetic rubber and tar. It was developed especially for airports by Naugatuck Chemical Division, Naugatuck, Conn.

New Foam Mattress

An addition to U. S. Rubber's foam rubber mattresses has been announced with the marketing of both twin-size and full-size Gold Label Koylon mattresses and matching foundations. Reversible, cored on both sides, and covered with attractive ticking, the new product supplements the more expensive Platinum Label Koylon foam units and foundations.

Plastic Steering Wheels

Cellulose acetate butyrate steering wheels for passenger cars were among the first products turned out by U. S. Rubber's new giant injection press at Fort Wayne, Ind. Long a major supplier of rubber steering wheels for the motor industry, the firm has now increased its production facilities to accelerate production of the item.

William S. Richardson, executive vice president of The B. F. Goodrich Co., has been elected to the board of trustees of Case Institute of Technology, Cleveland, O.

Wooster Broadening Its Field

Entry as a manufacturer into the institutional product field by Wooster Rubber Co., Wooster, O., has been announced. Beginning with the marketing of a heavy-duty bathtub mat for use in hotels, motels, etc., the company expects to develop a range of institutional products along the lines of its more than 70 houseware items. These items include "Rubbermaid" brand special and general-purpose mats and trays for bathroom and kitchen, dish drainers, drainboard trays, etc.

C. L. Largent has been appointed eastern division manager of The Firestone Tire & Rubber Co. Mr. Largent, who will make his headquarters in New York, N. Y., was formerly district manager for Firestone in Houston, Tex.

CANADA

Transfers Footwear Operations

B. F. Goodrich Rubber Co. of Canada, Ltd., this month transfers its footwear manufacturing operations in Kitchener, Ont., to the Province of Quebec. More than 400 employees will be affected.

Ira G. Needles, president, said a working agreement has been reached with a Quebec manufacturer for the production of Goodrich brand footwear, using Goodrich designs, specifications, and technical knowledge. Name and location of the manufacturer were not announced.

Mr. Needles further declared that high production costs, of which labor was a principal factor, had placed the company in a non-competitive cost position as compared to other footwear manufacturers, adding that the average wage of Goodrich footwear workers was substantially higher than the average Canadian wages for such work.

Anticipated Rubber Demand

It is expected that the Canadian rubber industry will need about 100,000 tons of rubber in 1960, approximately 20,000 pounds more than the volume used in 1952, on the basis of increased population alone. If, however, the population continues the trend toward increased use of rubber products, the industry will require more than 160,000 tons per year by that date. These figures were given by C. C. Thackray, president of Dominion Rubber Co., Ltd., at a recent dinner in honor of more than 200 company personnel who have served Dominion for 25 years or more.

Peter T. McDevitt has been appointed district manager for the Montreal, P. Q., district office of Carbide & Carbon Chemicals, Ltd., a subsidiary of Union Carbide & Carbon Corp., New York, N. Y. Mr. McDevitt joined the company in April, 1948, and was assigned to the Toronto district office as a correspondent and later as a technical representative.

Of Special Interest to
Canadian Rubber Manufacturers...
The Rubber Regenerating Co Ltd
TRAFFORD PARK · MANCHESTER · ENGLAND
The Largest Producers of Reclaimed Rubber
in the British Empire!
High grade reclaims from ALL NATURAL rubber scrap
Competitive prices
Prompt shipment
Delivery direct to customer's plant
Local stocks
Continuity of supply
For samples, prices and
further particulars apply to
our sole agents in Canada
H.L.BLACHFORD Limited
MONTREAL :- 977 Aqueduct Street
TORONTO :- 360 Old Weston Road

NEWS ABOUT PEOPLE

Henry F. Palmer

Henry F. Palmer has been named vice president in charge of research and marketing at U. S. Rubber Reclaiming Co., Buffalo, N. Y. He has had 28 years' administrative and technological experience in the rubber industry and has been particularly active in phases of the industry related to reclaimed and synthetic rubber. Since 1950, Dr. Palmer served as general manager and vice president of Kentucky Synthetic Rubber Corp., Louisville, Ky., and before that for four years had been a private consultant in rubber technology. Earlier, Dr. Palmer spent 21 years with the Firestone Tire & Rubber Co. Starting as a research chemist, he later became assistant chief chemist. Subsequently, as chief chemist for Xylos Rubber Co., a Firestone subsidiary, he developed a new high-pressure method for reclaiming rubber, known as the Palmer process. Later, on loan from Firestone for two years, Dr. Palmer served as production manager for the government's RFC synthetic rubber plants.

Stanley L. Martin has been appointed field engineer for the Republic Rubber Division, Lee Rubber & Tire Corp., Youngstown, O., with headquarters in Houston, Tex., where he will be responsible for contacting the rubber users in the southern part of Texas in the interests of Republic's belting, hose, and molded and extruded rubber products. He has been with Republic at Youngstown since July, 1952.

Norman L. Cooperman has been named technical service manager of the vinyl department of Nuodex Products Co., Inc., Elizabeth, N. J. He previously had been, for seven years, head of the rubber and plastics department of Thompson-Weiman Co. and had acted in a technical sales capacity throughout the eastern United States and Canada.

Ralph K. Guinzburg celebrated his twenty-fifth year as president of I. B. Kleinert Rubber Co., 485 Fifth Ave., New York 17, N. Y., on December 20. Mr. Guinzburg succeeded his father, Victor Guinzburg, who had developed the company from a small business to a multimillion dollar enterprise.

William C. Marshall has been appointed representative of the dyestuff department, American Cyanamid Co., Calco Chemical Division, Bound Brook, N. J., for the Pacific northwest territory and will make his headquarters at 935 N. W. 12th Ave., Portland 9, Oreg., serving all color consuming industries in northern California, Oregon, and Washington and the paper trade on the entire Pacific Coast. Mr. Marshall in 1918 joined the New York application laboratory of Heller & Merz; in 1926, was appointed Chicago sales and technical service representative; and in 1931, Pacific Coast sales representative for the company. In 1936 he became sales representative for Pacific Coast Supply Co., Portland, Oreg.

William A. Karl, president of Firestone Textiles, has been named a member of the board of trustees of the Textile Research Institute.

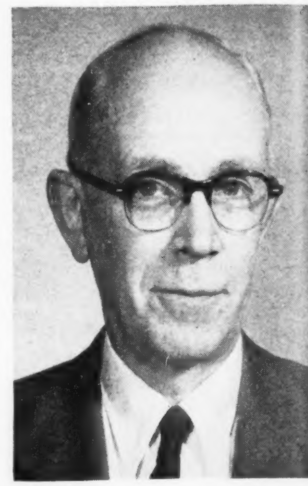
F. Doyle Bowers has been appointed southern district manager for the Republic Rubber Division, Lee Rubber & Tire Corp., Youngstown, O., and will be responsible for the operation of Republic's southern district office in Atlanta and for the supervision of Republic field representatives in Jackson, Miss.; Chattanooga, Tenn.; and Columbia, S. C. Bowers joined the company in 1943 after many years in the mill supply business. He has been a field representative for Republic with headquarters in Chattanooga.

Robert F. Sparrow has been appointed sales manager of Marco Co., Inc., Wilmington, Del., manufacturer of Flow-Master continuous processing equipment for the chemical, food, and rubber industries. Mr. Sparrow joined the company as service manager in 1945 after five years in the Navy. In 1947 he was advanced to the research division and still spends part time in research and development activities.

Ray P. Dinsmore, vice president in charge of research and development for The Goodyear Tire & Rubber Co., has been elected a director of the American Institute of Chemical Engineers for a three-year term.

Martin A. Thompson, assistant comptroller and auditor, Raybestos-Manhattan, Inc., Passaic, N. J., has been elected to membership in the Controllers Institute of America.

E. Willard Winslow recently was appointed manager—advertising and sales promotion, marketing section, silicone products department, with headquarters in Waterford, N. Y., for General Electric Co. Mr. Winslow started with the company in 1946 as a sales trainee, having previously been employed by the Cleveland Container Co. From 1947 to 1949, Mr. Winslow worked on the compilation of the chemical department products handbook and joined advertising and sales promotion in 1949 as a copywriter. He was most recently an advertising supervisor in the chemical division advertising and sales promotion section in Pittsfield, Mass.



Howard E. Elden

Howard E. Elden has been elected vice president in charge of manufacturing, research, and development at the Dunlop Tire & Rubber Corp., Buffalo, N. Y., which he had joined 30 years ago. He was made technical manager in 1932 and placed in charge of research and development in 1950. He also served as chairman of the tire and tube technical consulting committee to various branches of the government from 1944 to 1948. Elden is a Fellow of the Institution of the Rubber Industry and holds membership in the American Chemical Society and the Society of Automotive Engineers.

William J. O'Keefe, district manager, films, foam, and flooring division, The Goodrich Tire & Rubber Co., heads the rubber division of the current $411,732 campaign of the George "Junior Republic."

Kenneth Kashdan has been added to the sales staff in the Middle Atlantic States for Polymer Industries, Inc., 11-08 30th Ave., Astoria, L. I., N. Y. A veteran of 15 years' selling experience in the adhesives field, Kashdan will service laminators, packaging firms, and bottlers, as well as the shoe, leather, and rubber fabricating industries. Trained in adhesives chemistry, Kashdan will aid Polymer clients in selecting aqueous gums, resins, emulsions, latex and rubber cement products for their packaging and production problems. Polymer Industries recently announced a new expansion program keyed to its modern new plant scheduled to open in Stamford, Conn., early in 1954.

William G. Nelson, consultant to the technical director of production of United States Rubber Co.'s tire division recently retired after nearly 39 years with the company, which he had joined at Detroit in January, 1915, as a chemist. He was product control manager there for 16 years and technical director of production for the tire division for nearly five years. Nelson is a farming and hunting enthusiast, having a 100-acre farm in Oakland County, Mich., and a hunting lodge in the northern part of that state. Upon his retirement he plans to

n elected
facturing,
e Dunlop
Y., which
was made
placed in
pment in
in of the
commit-
overnment
Fellow of
ustry and
an Chem-
utomotive

manager,
ion, The
neads the
$411,732
r Repub-

added to
tic States
1-08 30th
eteran of
adhesives
aminators,
s well as
abricating
chemistry,
in select-
ons, latex
eir pack-
Polymer
new ex-
dern new
Stamford,

nt to the
of United
recently
the com-
Detroit in
was prod-
years and
for the
s. Nelson
st, having
ty, Mich.,
rn part of
e plans to

MUEHLSTEIN · FIRST IN SCRAP RUBBER AND SCRAP PLASTICS

Skiing such as this is no sport for novices. It calls for long experience. In business, too, it's long experience that counts. That's why it pays to deal with Muehlstein . . . for over forty years—and still today—leaders in the supplying of raw materials to the rubber, plastic and allied industries.

xperience counts

H. MUEHLSTEIN & CO. INC.

60 EAST 42nd STREET, NEW YORK 17, N. Y.

BRANCH OFFICES: Akron · Chicago · Boston · Los Angeles · Memphis

WAREHOUSES: Akron · Chicago · Boston · Los Angeles · Jersey City

RUDE RUBBER · SYNTHETIC RUBBER · SCRAP RUBBER · HARD RUBBER DUST · PLASTIC SCRAP

do research in horticulture and animal husbandry in connection with Michigan State College. Nelson is a member of the American Chemical Society and its Division of Rubber Chemistry; the Engineering Society of Detroit; Audubon Society; and Palestine Lodge—F. & A. M.; and is also a past president of Detroit Rubber & Plastics Group and Detroit Chemists.

Lieut. David S. Maimin, Jr., son of D. S. Maimin, president of H. Maimin Co., Inc., 575 Eighth Ave., New York, N. Y., will receive his release from the Armed Forces after more than 2½ years with the U. S. Army Corps of Engineers. He is expected to rejoin the Maimin organization, manufacturer of cutting machines for a variety of industries, this month. Prior to entering the service in 1951 he had been with the Maimin firm. Lieutenant Maimin will go through a complete indoctrination program upon his return to H. Maimin, eventually working in all departments, including factory, sales, and advertising.

OBITUARY

Oscar Nelson

Blank & Stoller

Oscar Nelson

A SUDDEN heart attack in his office caused the death, on November 27, of Oscar Nelson, president and general manager of United Carbon Co., Inc., Charleston, W. Va.

Mr. Nelson was born on March 2, 1879, in Hvena, Sweden, where he attended public schools.

He came to this country in 1899 and found employment in a glass plant at Kane, Pa. Several months later, however, he began his long and successful career in the carbon black industry, when he became a laborer for Peerless Carbon Black Co. in the same town, where he remained about a year. Then, from 1901 to 1914, he was on the payroll of Raven Carbon Co. and The Carbon Black Mfg. Co. In 1905, as field superintendent representing these firms, he first came to West Virginia. In 1908 the deceased was appointed superintendent of both concerns, with headquarters in Weston.

In 1914 the two firms merged with several smaller companies to form The Columbian Carbon Co., of which Mr. Nelson became general manager, a post he held until 1916, when he started his own business, The Nelson Co., with plants principally in West Virginia and Louisiana. When United Carbon Co., Inc., resulted from a merger of 15 companies in 1926 he became president of the new organization.

He was also president of United Producing Co., Combined Carbon Co., Westoak Gasoline Co., and United Gas Co. of West Virginia; vice president of Texas Carbon Industries, Inc., Kosmos Carbon Co., Eastern Carbon Black Co., and National Gas Producers Assn.; and a director of Carbon Black Export, Inc. Mr. Nelson, furthermore, was a trustee of St. Paul's Lutheran Church, a Rotarian, a Shriner, and a 32nd Degree Mason and belonged to the Edgewood and Kanawha Country clubs, the American Swedish Historical Foundation, the American Scandinavian Foundation, and the American Society of Swedish Engineers. He was also the recipient of an honorary doctor of laws degree from Upsala College and an honorary Farmer degree from the Future Farmers of America. Mr. Nelson was a leading breeder of Hereford cattle, and his Morlunda Farms was widely known.

He leaves his wife, three sons, a daughter, two grandchildren, and two brothers.

FINANCIAL

Allied Chemical & Dye Corp., New York, N. Y. January 1-September 30, 1953: net income, $33,738,809, equal to $3.81 a common share, against $29,709,142, or $3.35 a share, in the 1952 period.

Anaconda Wire & Cable Co., New York, N. Y. Nine months ended September 30, 1953: net earnings, $4,992,825, equal to $5.92 each on 843,962 capital shares, against $4,715,659, or $5.59 a share, in the 1952 period.

Archer-Daniels-Midland Co., Cleveland, O. Third quarter, 1953: net income, $1,043,574, equal to 63¢ a share, against $1,315,902, or 80¢ a share, in the 1952 quarter.

Belden Mfg. Co., Chicago, Ill. First three quarters, 1953: net earnings, $1,040,710, equal to $3.24 a share, compared with $687,752, or $2.14 a share, in the 1952 quarters; net sales, $20,650,075, against $15,806,221.

Borg-Warner Corp., Chicago, Ill., and subsidiaries. Nine months to September 30, 1953: net profit, $17,020,364, equal to $6.93 each on 2,396,289 common shares, compared with $13,701,554, or $5.54 each on 2,394,878 shares, a year earlier; net sales, $314,977,495, against $253,698,807.

Circle Wire & Cable Corp., Maspeth, L. I., N. Y. First nine months, 1953: net earnings, $1,529,679, equal to $2.04 a common share, against $1,644,135, or $2.19 a share in the like period the year before.

Philip Carey Mfg. Co., Cincinnati, O. Nine months ended September 30, 1953: net income, $1,853,118, equal to $2.24 a share, against $1,586,251, or $1.91 a share, in the corresponding period last year; net sales $39,144,202, against $39,270,463.

Columbian Carbon Co., New York, N. Y., and subsidiaries. First three quarters, 1953: net income, $3,376,537, equal to $2.09 each on 1,612,218 capital shares, compared with $2,906,655, or $1.80 a share, a year earlier; sales, $39,420,807, against $34,608,379.

Cooper Tire & Rubber Co., Findlay, O., and subsidiaries. Nine months ended September 30, 1953: net profit, $415,211, equal to $2.65 a share, against $238,816, or $1.52 a share, in the 1952 period; sales, $17,779,042, against $11,814,758.

Crown Cork & Seal Co., Inc., Baltimore, Md. Nine months to September 30, 1953: net profit, $934,476, equal to 43¢ a common share, compared with $719,455, or 25¢ a share, in the like period of 1952.

DeVilbiss Co., Toledo, O., and wholly owned subsidiary. Nine months ended September 30, 1953: net profit, $641,234, equal to $2.14 each on 300,000 capital shares, against $651,812, or $2.17 a share, in the 1952 months.

Dewey & Almy Chemical Co., Cambridge, Mass., and wholly owned subsidiaries. First nine months, 1953: net earnings, $1,256,116, equal to $1.37 a share, contrasted with $230,730, or 25¢ a share, a year earlier; net sales, $25,761,527, against $20,597,899.

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. Nine months ended September 30, 1953: consolidated net earnings, $172,829,089, equal to $3.62 a common share, against $155,754,111, or $3.26 a share a year earlier; net sales, $1,334,369,999, against $1,166,691,500.

Flintkote Co., New York, N. Y., and subsidiaries. Forty weeks ended October 10, 1953: net profit, $3,943,294, equal to $2.93 each on 1,260,435 common shares, against $3,680,294, or $2.71 a share, in the 1952 weeks; net sales, $72,274,972, against $64,334,310.

General Cable Corp., New York, N. Y. January 1-September 30, 1953: net profit, $3,906,231, equal to $1.76 a common share, against $3,618,489, or $1.61 a share, in the 1952 period; sales, $15,597,546, against $15,180,910.

General Motors Corp., Detroit, Mich. First three quarters, 1953: consolidated net earnings, $452,798,196, equal to $5.08 a common share, compared with $387,030,986, or $4.32 a share, in the 1952 months; consolidated net sales, $7,931,026,579, against $5,563,916,214.

Hewitt-Robins, Inc., Stamford, Conn. First nine months, 1953: net profit, $865,354, equal to $3.01 each on 287,051 shares, compared with $668,377, or $2.34 each on 286,051 shares, in the like period of 1952; net sales, $28,629,816, against $27,583,166.

We like to get complaints like this !!

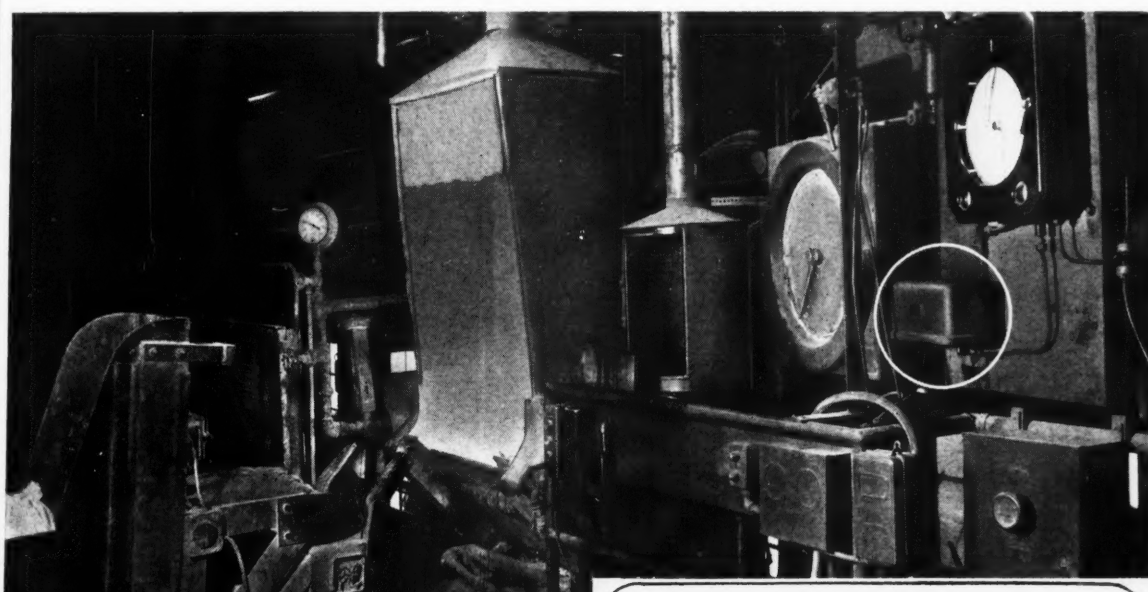
Recently our salesman visited the Hewitt Rubber Division of Hewitt-Robins Incorporated in Buffalo, N. Y., and asked how our new control system on one of their Banbury mixers was working out. "We have only one complaint", said the department supervisor: "when are you going to sell us the same hookup for the other Banbury?" Our man was glad to report that it had in fact already been ordered. This is particularly interesting because the "hookup" referred to is an ingenious system developed by Taylor to automatically *control* the temperature of the mix in a Banbury.

The heart of this system is the Taylor TRANSAIRE* Temperature Transmitter — a rugged, highly responsive temperature measuring system, economically applied to Banbury mixers. Its exceptionally fast response is due to the exclusive SPEED-ACT* derivative action, in the measuring circuit. This compensates for both the poor heat conductivity of the mix and the inherent thermal lag of the rugged separable well required. The output air pressure from the transmitter is connected to a Taylor FULSCOPE* Recording Controller, which regulates the admission of cold water as required to cool the mix, and gives them an accurate record of both the temperature and the time of every batch.

Hewitt-Robins' supervisor probably has plenty of other problems, but with Taylor in control he's sure of consistent mix temperatures in his Banbury, and he doesn't have to worry about heat deterioration—or the risk of fire. Call your Taylor Field Engineer on any instrumentation problem—or write Taylor Instrument Companies, Rochester, N. Y., or Toronto, Canada.

Instruments for indicating, recording and controlling temperature, pressure, flow, liquid level, speed, density, load and humidity.

*Trade-Mark



Here's how it works: cigarette size bulb of TRANSAIRE Transmitter is installed through wall of mixer about 1½" into mix just above rolls. Impulses are relayed to a Taylor FULSCOPE Recording Controller, operating a diaphragm valve in the chilled water line. This admits cold water as required to cool the mix to the desired temperature. Also provides record of true temperature and actual time of each batch.

Taylor Instruments

MEAN

ACCURACY FIRST

IN HOME AND INDUSTRY

Goodall Rubber Co., Trenton, N. J., and subsidiaries. Nine months ended September 30, 1953: net earnings, $166,468, equal to $1.38 each on 116,552 shares, against $165,276, or $1.43 each on 111,086 shares, in the 1952 period; net sales, $6,456,-021, against $6,643,548.

Goodall-Sanford, Inc., Reading, Mass., and subsidiaries. Third quarter, 1953: net loss, $396,689, compared with net loss of $225,674 in the 1952 quarter; net sales, $7,326,204, against $8,948,871.

Goodyear Tire & Rubber Co., Akron, O. January 1-September 30, 1953: consolidated net income, $35,321,461, equal to $7.57 each on 4,390,886 common shares, contrasted with $27,609,612, or $5.81 a share, a year earlier: net sales, $920,310,190, against $853,933,430.

Byron Jackson Co., Los Angeles, Calif. First nine months, 1953: net income, $1,020,007, equal to $1.92 a common share, against $1,011,550, or $1.91 a share, in the corresponding months of the previous year.

Minnesota Mining & Mfg. Co., St. Paul, Minn., and domestic subsidiaries. Nine months ended September 30, 1953: net income, $13,708,826, equal to $1.63 each on 8,218,985 shares, against $11,442,337, or $1.39 each on 8,014,736 shares, in the similar period of 1952: net sales, $162,996,479, against $133,778,460.

Monroe Auto Equipment Co., Monroe, Mich. Third quarter, 1953: net earnings, $56,858, equal to 13¢ a common share, compared with net loss of $20,917 in the corresponding period the year before; net sales, $4,450,079, against $3,066,178.

Mt. Vernon-Woodberry Mills, Inc., New York, N. Y. Nine months to September 30, 1953: net earnings, $1,162,000, equal to $1.80 a common share, contrasted with $2,329,000, or $3.62 a share, a year earlier; sales, $29,522,000, against $41,025,000.

National Lead Co., New York, N. Y. First three quarters, 1953: net earnings, $20,857,869, equal to $1.74 a common share, compared with $15,344,581, or $1.35 a share, in the same months of the previous year.

New Jersey Zinc Co., New York, N. Y. First nine months, 1953: net income, $2,871,654, equal to $1.47 a common share, contrasted with $10,035,454, or $5.12 a share a year earlier.

Parke, Davis & Co., Detroit, Mich. First nine months, 1953: net earnings, $6,707,768, equal to $1.37 a common share, contrasted with $13,828,507, or $2.83 a share, in the similar period of 1952.

Pittsburgh Coke & Chemical Co., Pittsburgh, Pa. Nine months to September 30, 1953: net income, $2,483,000, equal to $2.39 a common share, compared with $1,426,000, or $1.23 a share, a year earlier.

Rome Cable Corp., Rome, N. Y. Six months to September 30, 1953: net income, $933,000, equal to $1.87 a common share, compared with $1,058,000, or $2.17 a share, in the 1952 months.

Phillips Petroleum Co., Bartlesville, Okla., and subsidiaries. Nine months ended September 30, 1953: net earnings, $55,458,-247, equal to $3.80 each on 14,603,888 shares, against $56,292,149, or $3.87 each on 14,-554,252 shares, in the corresponding period of 1952.

Pittsburgh Plate Glass Co., Pittsburgh, Pa. First nine months, 1953: net income, $30,711,825, equal to $3.39 a share, against $26,617,605, or $2.94 a share, in the same months of 1952; sales, $346,993,772, against $293,964,356.

Raybestos-Manhattan, Inc., Passaic, N. J., and domestic subsidiaries. Nine months ended September 30, 1953: net income, $2,402,821, equal to $3.82 a share, compared with $2,131,273, or $3.39 a share, in the 1952 months.

Seiberling Rubber Co., Akron, O. Nine months ended September 30, 1953: net earnings, $762,063, equal to $1.54 each on 391,430 common shares, against $671,876, or $1.69 each on 301,010 shares, in the 1952 period; net sales, $30,998,937, against $31,-192,328.

St. Joseph Lead Co., New York, N. Y. First nine months, 1953: net profit, $5,965,-911, equal to $2.19 a share, contrasted with $8,332,600, or $3.06 a share, in the 1952 months; net sales, $69,269,310, against $78,390,417.

Sheller Mfg. Corp., Portland, Ind. Nine months to September 30, 1953: net profit, $2,702,810, equal to $2.83 a share, compared with $1,642,367, or $1.72 a share, a year earlier.

Swan Rubber Co., Bucyrus, O. Year ended July 31, 1953: net income, $755,187, equal to $1.18 a common share, against $753,092, or $1.17 a share, in the preceding fiscal year; net sales, $12,857,846, against $11,386,445.

Union Rubber & Asbestos Co., Chicago, Ill. Nine months ended September 30, 1953: net profit, $148,415, equal to 31¢ a share, compared with $471,583, or 99¢ a share, in the like period of the preceding year; net sales, $8,490,422, against $10,-262,323.

(Continued on page 546)

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
Anaconda Wire & Cable Co.	Com.	$1.75*yr.-end	Dec. 15	Dec. 3
Armstrong Cork Co.	Com.	0.70 yr.-end	Dec. 18	Dec. 3
Armstrong Rubber Co.	Cl. A	0.50 q.	Dec. 31	Dec. 11
	Cl. B	0.50 q.	Dec. 31	Dec. 11
	4¾% Pfd.	0.59⅜ q.	Jan. 2	Dec. 11
Baldwin Rubber Co.	Com.	0.15 q.	Jan. 25	Jan. 15
Canada Wire & Cable Co., Ltd.	Cl. A	1.00 q.	Dec. 15	Nov. 30
	Cl. B	0.75 q.	Dec. 15	Nov. 30
Circle Wire & Cable Corp.	Com.	0.40 q.	Dec. 24	Dec. 10
		0.10 extra	Dec. 24	Dec. 10
Cooper Tire & Rubber Co.	Com.	0.30	Jan. 12	Dec. 31
Crown Cork & Seal Co., Inc.	Com.	0.15	Dec. 31	Dec. 17
Crown Cork International Corp.	Cl. A	0.50 part.	Jan. 2	Dec. 10
		0.25 q.	Jan. 2	Dec. 10
		0.25 q.	Apr. 1	Mar. 10
	Cl. B	0.50 part.	Dec. 15	Dec. 10
		1.00	Dec. 15	Dec. 10
Dayton Rubber Co.	Com.	0.50 q.	Jan. 25	Jan. 11
	A	0.50 q.	Jan. 25	Jan. 11
Denman Tire & Rubber Co.	Com.	0.10	Jan. 4	Dec. 23
Detroit Gasket & Mfg. Co.	Com.	0.25	Jan. 25	Jan. 11
DeVilbiss Co.	Com.	0.30 extra	Dec. 21	Dec. 11
		0.30 q.	Jan. 21	Jan. 11
E. I. du Pont de Nemours, Inc.	Com.	1.25 yr.-end	Dec. 14	Nov. 23
	$4.50 Pfd.	1.12½ q.	Jan. 25	Jan. 8
	$3.50 Pfd.	0.87½ q.	Jan. 25	Jan. 8
Endicott Johnson Corp.	Com.	0.40 q.	Jan. 1	Dec. 24
Faultless Rubber Co.	Com.	0.25	Jan. 2	Dec. 15
Firestone Tire & Rubber Co.	Com.	0.75 q.	Jan. 20	Jan. 5
General Cable Corp.	Com.	0.55	Jan. 2	Dec. 4
	1st Pfd.	1.00 q.	Jan. 2	Dec. 4
	2nd Pfd.	0.50 q.	Jan. 2	Dec. 4
General Electric Co.	Com.	1.00	Jan. 25	Dec. 18
General Tire & Rubber Co.	4¼% Pfd.	1.06¼ q.	Jan. 31	Jan. 21
	3¾% Pfd.	0.93¾ q.	Jan. 31	Jan. 21
	3¼% Pfd.	0.81¼ q.	Jan. 31	Jan. 21
B. F. Goodrich Co.	Com.	0.80	Dec. 31	Dec. 8
Goodyear Tire & Rubber Co. of Canada, Ltd.	Com.	1.00 q.	Dec. 31	Dec. 10
Hewitt-Robins, Inc.	Com.	0.50 q.	Dec. 15	Dec. 2
Johns-Manville Corp.	Com.	0.75 q.	Dec. 10	Nov. 30
		1.25 yr.-end	Dec. 10	Nov. 30
Johnson & Johnson	Com.	0.25 extra	Jan. 11	Dec. 23
I. B. Kleinert Rubber Co.	Com.	0.25 q.	Dec. 15	Nov. 27
Lee Rubber & Tire Corp.	Com.	0.75 q.	Feb. 1	Jan. 18
Mansfield Tire & Rubber Co.	Com.	0.40 q.	Jan. 20	Jan. 4
Midwest Rubber Reclaiming Co.	Com.	0.25 q.	Jan. 1	Dec. 4
	Pfd.	0.56¼ q.	Jan. 1	Dec. 4
Monroe Auto Equipment Co.	5% Pfd.	0.62½ q.	Jan. 2	Dec. 11
Okonite Co.	Com.	0.50	Feb. 1	Jan. 15
Parker Appliance Co.	Com.	0.25 q.	Dec. 21	Dec. 8
Raybestos-Manhattan, Inc.	Com.	1.50	Jan. 4	Dec. 10
Rome Cable Corp.	Com.	0.35 q.	Jan. 5	Dec. 10
Seiberling Rubber Co.	Com.	0.25 q.	Dec. 21	Dec. 4
	4½% Pr. Pfd.	1.12 q.	Jan. 1	Dec. 15
	5% Cl. A Pfd.	1.25 q.	Jan. 1	Dec. 15
Thermoid Co.	Com.	0.10 q.	Dec. 31	Dec. 10
		0.10 extra	Dec. 31	Dec. 10
	$2.50 Pfd.	0.63½ q.	Feb. 1	Jan. 11
Viceroy Mfg. Co., Ltd.	Cl. A	0.12½	Dec. 15	Dec. 1
Westinghouse Air Brake Co.	Com.	0.40 q.	Dec. 15	Nov. 30
		0.40 yr.-end	Dec. 15	Nov. 30

Insure the good reputation of your products!!

• Be safe • be sure • be satisfied

SPECIFY EMERY FATTY ACIDS *everytime!*

In selecting the constituents that go into your products, you can't be too careful in getting the highest quality available, consistent with performance requirements and cost limitations.

When it comes to fatty acids, this careful selection always leads to Emery...because Emery Fatty Acids are safeguarded by modern processing methods and strict control of specifications, compositions and stability.

These advanced processing and control methods have been an outgrowth of Emery's pioneering in better and unique processes and products exemplified by the following innovations.

Emersol Solvent Crystallization Process	Colgate-Emery Fat Splitting
Lowest I.V. Crystalline Stearic Acid	High Pressure Dimerization
Low-Titer Semi-Drying Fatty Acids	Low Linoleic Oleic Acid
Ozone-Oxidation of Oleic Acids	Azelaic and Pelargonic Acids

So, when you need fatty acids, select the best...select from Emery's complete line of Emersol Stearic and Palmitic Acids, Hyfac Hydrogenated Fatty Acids, Emersol Oleic Acids, Vegetable and Animal Fatty Acids, and Special Fatty Acids and Derivatives.

Send for free literature...

Emery Industries, Inc.
Dept. B1, Carew Tower, Cincinnati 2, Ohio

☐ Solid Fatty Acids

☐ Rapid Composition Analysis for Commercial Stearic Acids

Name.............................*Title*............

Company..

Address..

City........................*Zone*......*State*.........

Emery

Fatty Acids & Derivatives
Plastolein Plasticizers
Twitchell Oils, Emulsifiers

Emery Industries, Inc., Carew Tower, Cincinnati 2, Ohio

Export: 5035 RCA Bldg., New York 20, New York

New York • Philadelphia • Lowell, Mass. • Chicago • San Francisco
Schibley & Ossmann, Inc., Cleveland • Ecclestone Chemical Co., Detroit

Warehouse stocks also in St. Louis, Buffalo, Baltimore and Los Angeles

FAST DELIVERIES

Fast deliveries plus exceptional performance make EEMCO Mills and Presses your best buy. Save weeks of valuable production time. Some sizes are available for immediate shipment.

MILLS

for processing rubber and plastics, including LABORATORY MILLS for experimental work.

PRESSES

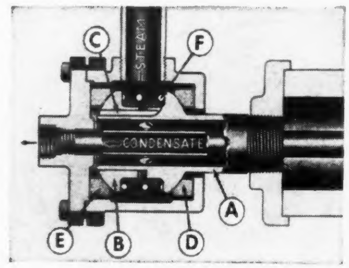
for compression, lamination, transfer and reinforced plastics molding —also LABORATORY PRESSES for experimental work.

EEMCO

ERIE ENGINE & MFG. CO.
12th ST. & EAST AVE., ERIE, PA.

New Machinery

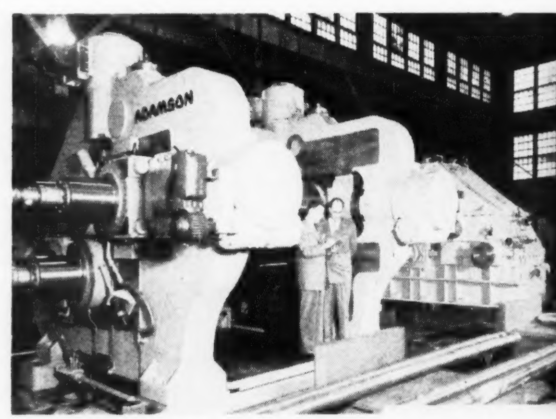
Type J Rotary Joint



Cutaway Section of Johnson Type J Joint, Showing Nipple (A), Thrust Collar (B), Nipple-Thrust Collar Attachment (C), Graphite Rings (D and E), and Spring (F)

THE Series 2000 Type J Joint, claiming the advantages of less weight, smaller size, lower price, and longer life for the wearing parts, is being offered by Johnson Corp., Three Rivers, Mich. Designed for admitting steam or fluids into rotating rolls and cylinders, the units are available in both through flow (one-way) and siphon pipe (two-way) models.

Type J joints are equipped with special carbon-graphite, self-lubricating seal rings which have an increased thickness at the web. Other features of the packless, self-adjusting unit include built-in flexibility to compensate for lateral and angular misalinement, and lugs cast on to the body to make possible installation with simple support rods.



28- by 78-Inch Four-Roll Z-Type Calender

New Z-Type Calender

ADAMSON UNITED CO., Akron, O., has announced a new Z-type calender for double-coating tire cord or producing two-ply laminated material at speeds up to 240 feet a minute. With certain relatively minor modifications, this 28- by 78-inch unit may also be used satisfactorily for producing plastic film and sheeting.

All four rolls are the peripherally drilled type, constructed for "triple pass" circulating water temperature control. Both of the offset rolls are equipped with motorized crossed axis equipment. Push-button control of the positions of the roll boxes, such positions being accurately indicated by instruments, is another feature of the calender. The unit is driven by anti-friction bearing-type universal spindles from a separate pinion stand. There are separate self-contained lubrication systems for the calendar and for the pinion stand. Auxiliary pullback bearings (zero clearance) are provided for removing main bearing clearance and screw-down clearance. Roller bearings are also available for the main bearing boxes.

Surfacer for Molded Rubber

A NEW machine for the precision surfacing or planing of molded rubber flooring, shoe soling, and kindred rubber and plastic products to thicknesses to a tolerance of 0.001-inch has been announced by Buss Machine Works, Holland, Mich. Known as the Micro-Surfacer, the unit claims the major advantage of

y

2000 Type
aiming the
of less
ller size,
and longer
wearing
ng offered
orp., Three
Designed
steam or
ating rolls
the units
in both
(one-way)
ipe (two-

oints are
h special
te, self-lu-
t the web.
le built-in
alinement,
ation with

ed a new
producing
minute.
78-inch
stic film

ucted for
h of the
quipment.
ich posi-
r feature
ring-type
are sep-
and for
earance)
l screw-
he main

ning of
bber and
nch has
Known
ntage of

ANY WAY YOU LOOK AT IT...

Photo by Constance Bannister

ANTIOXIDANT 2246*

is the most active, non-staining, non-discoloring antioxidant commercially available. Ideal for white and light-colored stocks. *Send for technical bulletin.*

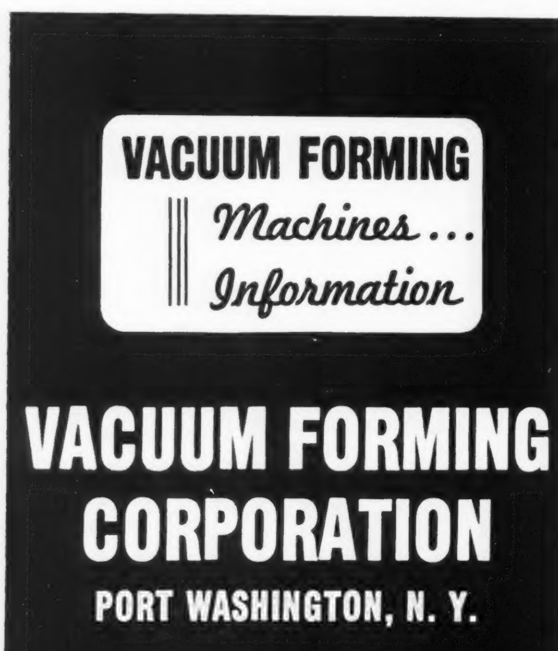
*Trade-mark

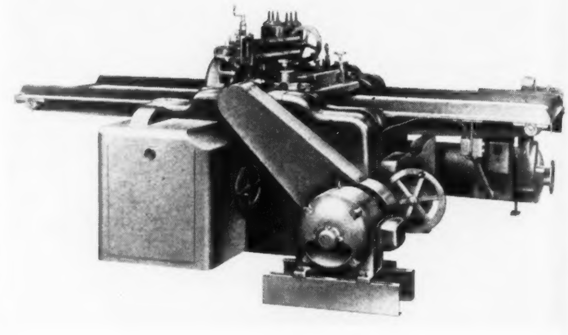
Calco

AMERICAN Cyanamid COMPANY
CALCO CHEMICAL DIVISION
INTERMEDIATE & RUBBER CHEMICALS DEPARTMENT
BOUND BROOK, NEW JERSEY

SALES REPRESENTATIVES AND WAREHOUSE STOCKS

Akron Chemical Company, Akron, Ohio • Ernest Jacoby and Company, Boston, Mass. • Herron & Meyer of Chicago, Chicago, Ill.
H. M. Royal, Inc., Los Angeles, Calif. • H. M. Royal, Inc., Trenton, N. J. • In Canada: St. Lawrence Chemical Company, Ltd., Montreal and Toronto

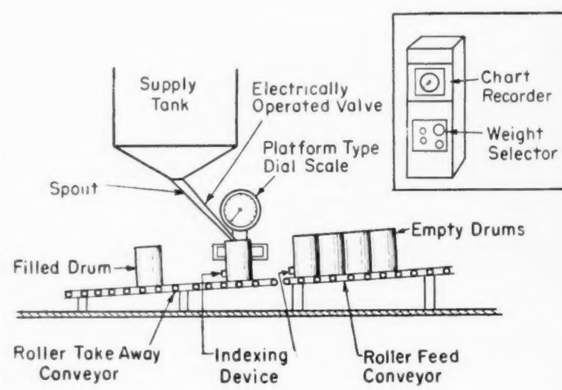




Buss Micro-Surfacer

eliminating the sand and grit resulting from sanding methods which lodge in the material to inhibit gluing operations.

In operation, conveyors feed molded sheets to four feed rolls, of which the upper two are rubber, and the lower two are chrome-plated steel. The stock passes under a high-speed rotating cutterhead having carboloy knives. Thin sheets are accommodated on a patented work platen. The knives of the cutter are reground after surfacing approximately 15,000 sheets, by a built-in grinding unit. Variable speed mechanisms are provided for the unit, which can handle sheets up to 50 inches wide.



Schematic Diagram of Tare-Weighing System

Automatic Tare-Weighing System

AN AUTOMATIC tare-weighing system based on an advanced-type of instrumentation has been developed by Richardson Scale Co., Clifton, N. J. Weighing and filling of a container with a solid or liquid product can reportedly be accomplished within an accuracy of less than 0.1%.

Shipping containers are fed to the machine manually or by an automatic indexing system, then weighed and tared with instruments attached to the scale. The precise weight of the product in the container is then recorded or printed for permanent record. Key items in the taring process are precise synchromechanism transducers used to cancel the unbalance in an electrical circuit created by the weight of the empty containers. The synchromechanisms have an accuracy of one part in 2,000, but considerably more accurate units are available.

New Tempilstiks°

THE development of two new Tempilstiks° for 282 and 294° F. have been announced by the manufacturer, Tempil° Corp., New York, N. Y. These units complement those for temperatures of 275, 288, 294, 300, and 313° F. which have been produced by the firm for use as a simple and accurate means of checking mold temperatures.

Especially useful in tire retreading operations, the Tempilstik° is stroked on the mold to produce a liquid smear when the temperature is equal to or greater than the rating of the stick. Five units, with temperature ratings from 275 to 300° F., are being marketed in a packaged set by the manufacturer.

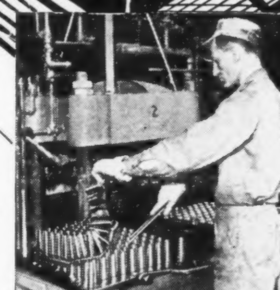
DOW CORNING Mold Lubricants Add Sales Appeal

"Show 'em and sell 'em!"

Experienced salesmen know that product appearance is often the deciding factor in successful selling. And experienced pressmen know that clean, easy release is a deciding factor in successful production.

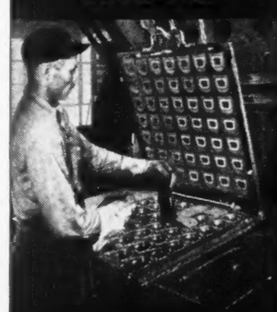
Get 'em both with Dow Corning silicone mold lubricants. Your molds stay cleaner longer, and they produce parts with a high glossy finish that's bound to mean greater customer appeal. That's because these silicone release agents can't break down at molding temperatures to form a carbonaceous build-up. Non-flammable and non-corrosive, they help cut mold cleaning costs as much as 80%. Scrap is reduced to the vanishing point.

Specify Dow Corning silicone mold release agents today. Fluids for green carcass, bead and parting line release; emulsions for molds, mandrels and curing bags.



Deep Cavity Molds

Curing Bags



Heavily Loaded Stocks

Dow Corning Silicones Mean Business!

For more information, call our nearest branch office or write direct for data sheet M-13.

DOW CORNING SILICONES

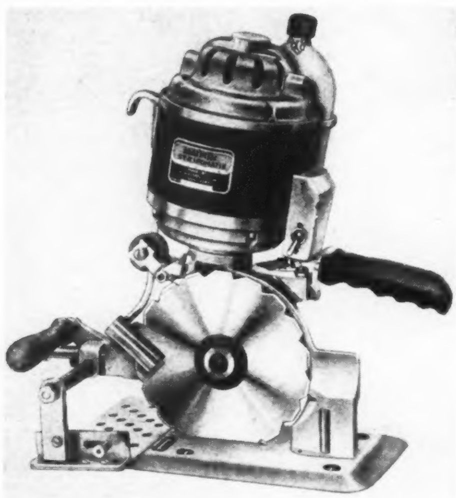
DOW CORNING CORPORATION
MIDLAND, MICHIGAN

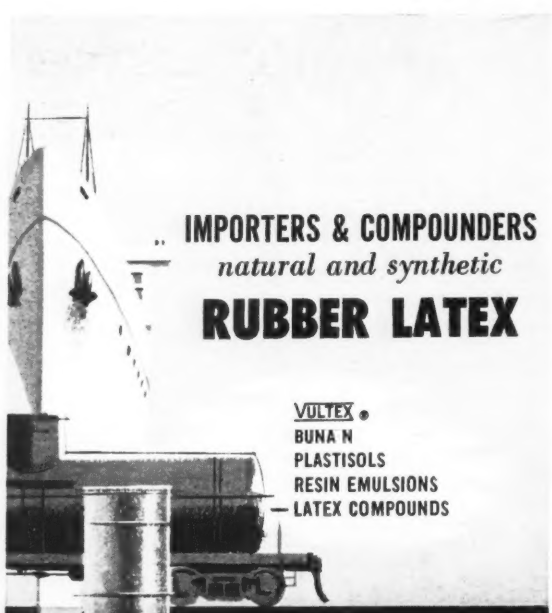
ATLANTA CHICAGO CLEVELAND DALLAS DETROIT LOS ANGELES NEW YORK WASHINGTON, D. C. (Silver Spring, Md.)

In Canada: Fiberglas Canada Ltd., Toronto In Great Britain: Midland Silicones Ltd., London

HAVE YOU CHECKED MAIMIN STRIPOMATIK

the super powered portable cutting machine that cuts 95 durometer rubber like butter! Write for impressive facts and figures about the Maimin STRIPOMATIK now. H. MAIMIN CO., INC., 575 Eighth Ave., New York 18, N. Y.





New Materials

Activator for Cold GR-S

THE availability of experimental quantities of phenylcyclohexyl hydroperoxide, a material which has reportedly shown excellent results as an activator for GR-S cold rubber formulations, has been announced by Monsanto Chemical Co., St. Louis, Mo. The new product, a yellowish liquid composed of 20% phenylcyclohexyl hydroperoxide in phenylcyclohexane, also may be good as a polymerization catalyst for other applications such as styrenated polyesters. It is reported that recent tests have produced polymerization recipes for preparation of cold GR-S rubber in less than 20 minutes at 41° F.

Hydrocarbon Resin—Polyrez

POLYREZ, a sulfurized hydrocarbon resin that is reportedly thermoplastic and oil resistant, has been introduced by Harwick Standard Chemical Co., 2595 E. State St., Trenton, N. J. Claimed capable of being plasticized with aromatic oils (such as Piccocizer 30 or Sovaloid C) and a variety of other plasticizers (such as dioctyl phthalate, dibutyl phthalate, and tall oil), the new material is suggested for use with neoprene because it plasticizes or softens the stock; reduces sticking to calender or mill rolls; acts as a processing aid; results in better oil and ozone resistance with lower cost; has good electrical properties; and is an excellent extender for neoprene, in which capacity it can replace GR-S or natural rubber with improved results.

The resin is also reported to have outstanding reinforcing action in non-black GR-S compounds. Being a high polymeric material, Polyrez can be expected to act like a rubber hydrocarbon in many compounds. Its use in GR-S compounds to improve oil and ozone resistance has also been suggested.

Cellular Polyethylene Compound

THE development of a unicellular polyethylene with half the weight and a dielectric constant of that of regular polyethylene has been announced by Bakelite Co., New York, N. Y. Heating of the polyethylene compound, which presumably contains a gas-liberating component, results in the formation of an essentially unconnected cell structure. Successful results have reportedly been obtained for extruding the material on various sizes of wire to insulate such items as ultra-high-frequency television lead-in wires.

During the extruding process, the heated compound is kept under pressure in the extruder and die, expanding to twice its usual volume immediately after leaving the die. It is claimed that the amount of expansion can be controlled to the exact degree desirable for the application involved by mixing the material with regular polyethylene.

In addition to the wire application mentioned above, the reported high resistance of the cellular polyethylene to water penetration suggests its use for flotation equipment.

Plastic Putty

A PLASTIC putty for making reusable spray masks, stencils, and cementing fixtures for toys, signs, and general industrial equipment has been developed by Chemical Development Corp., Danvers, Mass. Called CD Spray Mask A, the new material is recommended for use in masking off metal, plastic, or other surfaces during paint-spraying, cementing, flocking, etc. The manufacture of jigs and fixtures for holding parts during cementing and machining, of low-pressure forming dies, and of molds is another suggested application for the product.

Supplied as a putty, CD Spray Mask A will reportedly harden to a solid within one to two hours after the addition of a catalyst, reproducing a surface without distortion or shrinkage. The application of heat or pressure is not required. The material can be applied with a putty knife to vertical surfaces without sagging, and the hardened mask is capable of being added to with unhardened putty. Carving, machining, sanding, and similar operations can be performed on the hardened product with regular metal-working equipment.

Finished forms of the new material are claimed to be unaffected

(*Continued on page 534*)

New Goods

Vinyl Outerwear Material

CAST vinyl-coated material with a knitted fabric backing has been developed by United States Rubber Co., Rockefeller Center, New York 20, N. Y., for fabrication into outer garments such as coats, jackets, gloves, caps, etc., and into sleeves and knee and elbow reinforcements on washable clothing. Known as U. S. Elastic Naugahyde for outerwear, the new product is reportedly waterproof, pliable, and comfortable at low temperatures, strong, easily draped, and soft, chamois-like to the touch.

Capable of being stack cut and sewn, the material is claimed to be resistant to abrasion, scuffing, and tearing, as well as to oils, greases, and most dirt stains. Cleaning can be accomplished with soap and water. The product is manufactured in 12 colors and is sold directly to fabricators in 30-yard rolls having a width of 52 inches.

All-White Floor Matting

NU-TREAD ALPINE WHITE, a corrugated rubber floor matting reported to be dead white in color, is being produced by Boston Woven Hose & Rubber Co., Cambridge, Mass. Credited with making possible the white product is the Rotocure rubber curing method employed which results in material having uniform vulcanization, thickness, stretch, and color. Sound absorbency and resistance to rough wear, chemicals, alkalies, and discoloration through aging are added properties claimed for the matting.

The new product is intended to complement the company's present decorator line of corrugated rubber mattings, which include the colors of green, red, brown, grey, and black. All matting is sized in 1/8-inch thickness, with widths from 24-72 inches. Delivery is in rolls containing from 20-60 yards of the material.

Vinyl Table Tops

VINYL face sheets, laminated to firm rubber-saturated backing and capable of being decorated with gold leaf, have been introduced by Bolta Products Sales, Inc., Lawrence, Mass., for use on table tops. Called Boltaflex Table-Top Vinyl, the material is unaffected by alcohol and is finished with a top spray that produces a high gloss and sheen.

Available in fade-resistant colors of brown, tan, dark red, and dark green, the vinyl product is featured in a leatherprint pattern (for shading with vinyl gold leaf). Rolls of the material four feet wide are sold to table manufacturers for use on cocktail, occasional, and other decorative tables, although its use on desks is also recommended by the producer.

Iron-Rubber Sheets

STEEL sheets, bonded on one or both sides with rubber, are being manufactured for use as protective sheeting in abrasion and corrosion applications by Magic Chemical Co., Brockton, Mass. Known as Iron-Rubber, the product provides protection for items such as chutes, hoppers, ball mills, tanks, etc.

The sheets can reportedly be formed to fit most contours without subsequent springback and can be stood on edge without buckling. Made in standard sizes and thicknesses, Iron-Rubber can also be fabricated by the company to any specified thickness and length, and to widths up to 36 inches.

Hose for Propane

A NEW propane gas hose for tank-truck delivery service is being offered by Hewitt-Robins, Inc., Stamford, Conn. Constructed with a three-braid reinforced carcass which contains a synthetic compound resistant to propane permeation, the hose has a mirror-finish neoprene tube and a synthetic rubber outer covering. Static wire is built into the carcass to drain off static charges.

Capable of withstanding pressures up to 350 psi., the new product is claimed to be highly flexible, light in weight, and resistant to weathering, sun checking, and oil deterioration. Three sizes of the hose are available: 1/2-, 3/4-, and one-inch inside diameter.

RCMA
RAY-BRAND

CENTRIFUGED LATEX

RUBBER CORPORATION OF AMERICA

- Normal Latex
- CR-S Latex Concentrate
- Natural and Synthetic Latex Compounds
- Plastisols

RC PLASTICIZERS

- Dibutyl Phthalate—(DBP)
- Triethylene Glycol Dicaprylate—(TG-8)
- Di-iso-octyl Phthalate—(DIOP)
- Di-iso-octyl Adipate—(DIOA)
- Iso-octyl Palmitate—(0-16)
- Iso-octyl Iso-decyl Phthalate—(ODP)
- Di-iso-octyl Sebacate—(DIOS)

We maintain a fully equipped laboratory and free consulting service.

RUBBER CORPORATION OF AMERICA

274 Ten Eyck Street, Brooklyn 6, N. Y.
111 West Monroe Street, Chicago 3, Ill.

SALES REPRESENTATIVES: Ernest Jacoby & Co., 79 Milk St., Boston 9, Mass.; Charles Larkin II, 250 Delaware Ave., Buffalo 2, N. Y.; Ernesto Del Valle, Tolsa 64, Mexico, D.F.

IMS CONCENTRATED

SILICONE

BOMB

MOLD LUBE

The Best Mold Release You Can Buy! Forms a "Slick Quick"!

UNDILUTED
ODORLESS
NON-TOXIC
SAFE

Dry Freon Propellent Protects Your Molds

PRICES:

Sample Can ... $ 2.00
Unbroken Dozen $18.00
(at $1.50 each)
Unbroken Gross $197.40
(at $1.37 each)

Further discounts on larger orders

INJECTION MOLDERS SUPPLY CO.

3514 LEE ROAD WYoming 1-1424 CLEVELAND 20, OHIO

Hood Safety-Seal 400

Miller Safety-Guard Imperial

Non-Skidding Tubeless Tire

THE B. F. Goodrich Co., Akron, O., has announced the development of a puncture-sealing tubeless tire which features a special tread designed to protect against skidding on wet and icy pavements. This tread consists of hundreds of Safety Grip Blocks molded into four traction center bars; both the Blocks and the bars are sized and spaced to assure quiet running. Deep, well-vented shoulders and greater tread width reportedly permit cool running of the product with increased traction.

The Hood Safety-Seal 400, as the new tire is called, has a layer of gummy rubber under the tread which seals punctures as soon as the foreign object is removed. Also featured on the tire is a Blowout Shield consisting of a double liner of synthetic rubber extending over the entire inside of the unit and permanently bonded to the cord body. The Shield is said to protect against blowouts caused by bruises and, in combination with Rim Seal ridges, helps retain the air within the tubeless tire. The Safety-Seal 400 is made with both black and black-and-white sidewalls in the full range of low-pressure sizes.

Puncture-Sealing Tubeless Tire

A tubeless tire which reportedly protects against blowouts, seals punctures, and offers maximum protection against skidding with an eight-rib tread also is available from Goodrich. Protection against scuffing, wider tread, new shoulder design, and Blowout Shield are other features of the product.

Called the Miller Safety-Guard Imperial, this new tire also comes in both black and combination black-and-white sidewalls in all low-pressure sizes.

Neoprene Clothing

OVERCLOTHING, such as jackets, pants, coats, aprons, etc., is being made by M. L. Snyder & Son, Philadelphia, Pa., with a coating of neoprene on both the inside and the outside of the garment. The reportedly tough, flexible, comfortable, and cool fabric is covered with the synthetic rubber after the seams have been sewn, to protect the stitching, and the finished product is said to be resistant to snagging, peeling, sticking, and cracking.

The clothing is intended to protect the wearer from salt water, acid, oil, gasoline, alkalies, etc., in which capacity it has an expected life of from two to three times as long as earlier rubber clothing or oilskins. Cleaning of the garment involves rinsing in a petroleum solvent cleaner and drying in air. The olive drab clothing is available in two weights: a heavy type for severe work and long service; and a medium weight, with the inside surface dip-coated, for applications where cool, thin, and less expensive garments are required. Bolts of cloth for those wishing to make clothing of their own design are also available.

Plastic Putty

(Continued from page 532)

by most solvents, including acetone, oils, and water; light in weight; possessed of high impact, tensile, and compressive strength; and non-acid and non-corrosive. CD Spray Mask A is supplied packaged with catalyst and a special release agent and is said to be capable of being stored at 70° F. for periods of a year or more without adverse effects.

EUROPE

FRANCE

Crude Rubber Imports and Consumption

French imports of new rubber in 1952 came to 125,639 tons, against 135,062 tons the year before, and included 12,541 tons of synthetic rubber, against 10,230 tons in 1951. Malaya supplied more than half the natural rubber, and Canada about five-sixths of the synthetic rubber imports.

Consumption of rubber, including reclaim, was officially put at 145,286 tons for 1952 and 136,211 tons for 1951. Production of tires and tubes and tire repair material accounted for 86,572 tons in 1952 and 83,997 tons in 1951; and other rubber goods, for 58,714, against 52,214 tons.

The 1952 increase was due to larger consumption for automotive tires (67,893, against 63,848 tons); mechanical goods (11,840.7, against 9,509.1 tons); heels and soles (8,169.4, against 7,219.8 tons); footwear (10,019.9, against 9,676.8 tons); sponge and foam rubber goods (3,115.5, against 2,647.6 tons); hose and belting (8,108, against 7,268.7 tons).

Among the articles for which rubber consumption dropped were cut sheet (25.6, against 1,141.9 tons) and elastic thread (528, against 767.4 tons).

New Materials Developed

Subelat, a new special ingredient for latex, is a natural vegetable product extracted from cork. The chemical composition is too complex to be precisely indicated, but for the present it can be stated that it is an aqueous emulsion of long-chain, fatty acids and hydroxyacids, including also esters of these acids and hydroxyacids.

Tested on a laboratory scale, Subelat proved to be a versatile ingredient for latex, capable of producing, by itself, a large number of different effects at one time. It is a non-foaming mechanical stabilizer, and effective heat-sensitizer in the presence of normal curing ingredients; it facilitates penetration into fabrics and increases adhesion of latex to porous materials, it is claimed.

Subelat, developed by Professors Dupont and Guillemont, is patented by Centre National de la Recherche Scientifique. Its use in emulsions of natural and synthetic rubber was investigated and patented by M. J. d'Auzac de la Martinie.

Société "Le Raffineries de Soufre Réunies" has developed a sulfur marketed as "Soufre Mu," which is claimed to contain 95% of amorphous sulfur insoluble in carbon disulfide. With the necessary precautions, this sulfur can be employed for all the usual purposes both in natural rubber and synthetic elastomers, it is claimed. The sulfur is also said to have adequate stability if stored under conditions where it cannot come in contact with chemicals that could cause it to revert to the crystalline form.

Apparently the installation where it is produced at the rate of 12-15 tons a month is the only one of its kind in Europe.

New liquid and semi-paste protective coatings, based on special synthetic rubbers, have been developed at the Uetwiller Laboratories, Clamart (Seine), and are being marketed under the name, Utaprene. The coatings are easily applied by brush, pistol, or trowel, but best results are said to be obtained by brushing on. These coatings are claimed also to be unusual in that they combine a number of qualities, yielding surfaces which not only have good resistance to various corrosive chemicals (mineral and organic acids, cold mineral bases, moderately reactive oxidants, non-aromatic hydrocarbons), but also withstand weathering very well, especially the action of the sun. At the same time the coatings are extremely flexible and have a certain plasticity so that they can undergo considerable deformation without any tendency to crack; finally they are impermeable to gas and water.

Among the agents which attack Utaprene coatings to a certain extent are: strong oxidants, concentrated nitric acid and concentrated oxygenated water; hot concentrated mineral bases; phenols, aromatic hydrocarbons, chlorinated products, and heavy esters.

The Utaprenes are recommended for protecting apparatus in the chemical industry; in the petroleum industry, for preventing infiltration of hydrocarbons in concrete reservoirs; in public works, for protecting pumps, piping, rolling stock against abrasion by sand, stones, or sandy water, etc.; in the automobile industry, for protection of mechanical parts against wear, abrasion by sand, grit, filings, and the like; weather-proofing external parts, reducing noise, etc.

everybody talks

QUALITY

these pure light red iron oxides

by WILLIAMS assure it!

R-1599 R-2199 R-2899

They represent the ultimate in red iron oxide colors for the rubber industry.

Williams iron oxides come to you with all the benefits of our 75 years in the pigment business . . . and as a result of our experience in producing pure red iron oxides to specifications of the leading rubber companies.

Each is manufactured to rigid specifications for copper and manganese content, pH value, soluble salts, fineness, color, tint and strength by controlled processes and with special equipment. *The result is absolute uniformity of product.*

If you haven't already done so, try these finest of all iron oxide colors. Your own tests will show there is no equal for Williams experience.

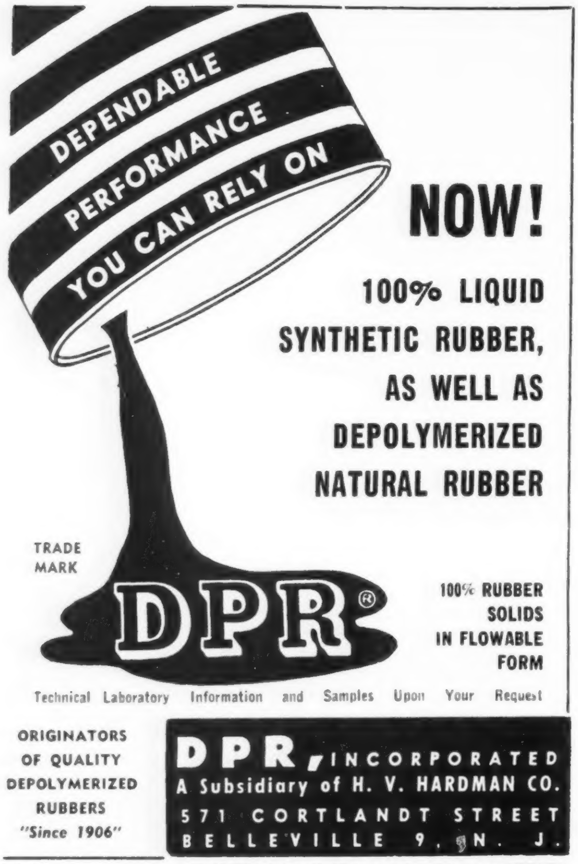
LET WILLIAMS PUT THE MICROSCOPE ON *Your* COLOR PROBLEM

Whatever your color problem, bring it to Williams. Our 75-year experience can often save you time, money, and headaches in proper color formulation.

Address Dept. 9,
C. K. Williams & Co., Easton, Pa.

IRON OXIDES • CHROMIUM OXIDES
EXTENDER PIGMENTS

WILLIAMS
COLORS & PIGMENTS
C. K. WILLIAMS & CO.
EASTON, PA. • EAST ST. LOUIS, ILL. • EMERYVILLE, CALIF.



Rubber Symposium

For the twenty-sixth International Congress of Industrial Chemistry, the Association Française des Ingenieurs du Caoutchouc jointly with the Syndicat National du Caoutchouc and the Institut Français du Caoutchouc arranged a Rubber Symposium, held June 24-26 in Paris. The following papers were presented:

"Macromolecular Chemistry and Elastomers," C. Champetier (Sorbonne).

"Contribution to the Study of Light and Ozone Resistance of Vulcanized Rubber," C. Pinazzi (I.F.C.).

"A New Oxidation Method for Natural Rubber Latex," Miss Tournier (Société d'Electro-Chimie & d'Electro-Metallurgie d'Ugine).

"Direct Manufacture from Latex of Chlorinated and Hydrochlorinated Natural Rubber Derivatives," H. C. J. de Decker (Rubber Stichting).

"Changes in the Polymeric Structure of Natural Rubber," L. C. Bateman and W. F. Watson (BRPRA).

"Characteristics and Applications of Butyl Rubber," M. Moulin (Esso Standard).

"New Types and Uses of Silicones," P. H. Morel (Rhone-Poulenc).

"Interaction of Fiber and Rubber in Rubber-to-Fabric Adhesion," W. C. Wake.

"Evolution of the Reinforcing Fillers," L. Kahane (Laboratoire de Recherches & de Controle du Caoutchouc).

"Some Innovations in Equipment for the Rubber Industry," J. Lescuyer (Lescuyer-Villeneuve).

"New Laboratory Instruments for the Rubber Industry," H. Lhomme (Lhomme & Argy) and L. de Cugnac (Mecanique Industrielle d'Enghien).

"Trends in Conveyors," R. Coeuillet (Charbonnages de France).

"Oxido-Reduction Processes and Coloring of Latex," R. Delattre (Cie. Française des Matieres Colorantes).

"Rubber Hydrostatic Compression Springs," J. Jarret.

"Punctureproof Tires," E. Destinay (Englebert).

"Aging and Weather Resistance of Vulcanized Rubber," J. M. Buist (I.C.I.).

"Physical Tests," P. Duro (Joint Français).

"Chemical Tests," G. Lamm (Laboratoire de Recherches).

"Tear Resistance of Reinforced Rubber in Relation to Its Structure," R. Houwink and H. J. J. Janssen (Rubber Stichting).

Decline in Manufacturing Sets in

The steady growth of activity in the French rubber manufacturing industry, noted since the end of the war, appears to be slowing down to some extent, judging by a brief review for 1952.[1]

That year the tire industry on the whole maintained production at the 1951 level; a notable reduction in cycle tire output was offset by an increase in the manufacture of airplane tires, which have been in increasing demand. In the latter part of 1952, however, tire sales declined, particularly on the home market, and the value of tire business fell from 53 billion francs in the first half of 1952 to 41 billion francs in the second half. Stocks of unsold tires accumulated at the factories, and production programs had to be cut. The manufacture of mechanical rubber goods followed a similar trend so that at the end of 1952, tire factories were working at 85% and mechanical goods sections at 75% of capacity.

Price cuts were also announced. Tire prices, raised an average of 10% in February, 1952, were reduced 6% in May and 8% in July, of that year. Reductions in the prices of mechanical goods averaged 15-20% by the end of 1952.

Reduced domestic demand could not be offset by higher exports; indeed, in certain lines foreign competition was able to cut into exports. With regard to hose and tubing, competition of products made from plastics was also a factor.

The number of persons employed by the French rubber industry dropped from about 60,000 in July, 1952, to 56,500 by December 31, 1952, and in certain shops the work week was cut from 48 to 32 hours.

The raw material situation was easier in 1952, and no difficulties were experienced in obtaining adequate supplies of carbon black (of which the United States provided 27,500 of a total 31,500 tons), textiles, or accelerators and antioxidants. In fact it is stated that there was a surplus of the last two items due to the increase in domestic production.

Consumption of synthetic rubber rose from about 9,000 tons in 1951 to about 12,300 in 1952 because of the increasing use of synthetic rubber for soling material, of neoprene for conveyor belts and electric cables, and of butyl for inner tubes.

[1] *Rev. gén. caoutchouc*, 30, 6, 374 (1953).

Federation of Chemical Engineering

A European Federation of Chemical Engineering was formally inaugurated at a Foundation meeting held in Maison de la Chimie, Paris, June 20. The first steps toward setting up this Federation, the purpose of which is to promote European cooperation in the fields of chemical engineering and equipment, were taken in 1951 and successfully continued in 1952 during the European Convention for Chemical Engineering and the Achema X Exhibition for Chemical Engineering & Equipment held in Germany.

Scientific and technical institutes in a number of European countries have already joined the Federation, and many more have indicated their early intention of doing likewise. A management committee has been formed to manage Federation activities, to which the following were elected: Herbert Bretschneider, Germany; Hans C. Egloff, Switzerland; Francis A. Freeth, Great Britain; and Jean Gerard, France. Headquarters are located in Maison de la Chimie and in Dechema-Haus, Frankfurt a.Main, Germany.

Plastics at Chemical Exposition

The French plastics industry has advanced considerably in recent years and now ranks fifth after the United States, Germany, England, and Japan. This industry includes some 2,700 factories of various sizes, which employ a total of about 34,000 persons and have an annual output estimated at around 40,000 tons.

Manufacturers displayed the wide range of their products during the special Plastics Week organized in connection with the Second Chemical Exhibition which was held in Paris, June 18-29, 1953.

About 100 firms producing plastic materials, finished goods, and machinery were represented, including among them also a number of important foreign firms, chiefly American, German, Italian, and British companies. *Modern Plastics* had its own big stand, where a great variety of American products was shown.

Plastics experts participated in the twenty-sixth Chemical Congress held in connection with the exhibition, and at the meetings of the section of natural and synthetic resins and plastics, held June 23 and 24, 13 papers were presented in which were discussed vinyl abietate polymerization and copolymerization, fluorine plastics, furane resins, alphanol and nonanol-based softeners; also the Dynstat developed by the Centre d'Etude des Matieres Plastiques and its new plastometer.

A series of more popular lectures was offered to the general public to acquaint it with the uses and possibilities of plastics for novelties, for packaging materials, and in the electronics, radio, construction, and transportation fields. In connection with the latter, it was pointed out that automobiles now use about 20 kilograms[1] of plastics in the form of insulations for wires and cable, mechanical parts, upholstery, and the like, and that attempts were being made to use polyester-resins reinforced with fiber glass for the bodies of cars.

Concurrently with the plastics sessions was held a rubber conference arranged by the French Association of Engineers of the Rubber Industry, which was attended by more than 250 persons. Representatives of leading French and foreign research and commercial organizations were present, and about 20 papers were presented on various questions relating to natural and synthetic rubbers, compounding ingredients, machinery, and manufactured products.

[1] Kilogram = 2.2 pounds.

French Trade Notes

Damage, estimated at around $550,000, resulted when a fire broke out on March 15 at the Clermont-Ferrand factory of the Michelin company. Besides the loss of 400 tons of crude rubber, extensive destruction of the company testing track was reported.

Cie. de Saint-Gobain, manufacturer of glass and a wide range of chemical products, recently opened two new research laboratories—the Centre de Recherches des Glaceries in Paris and the Centre de Recherches des Produits Chimiques at La Croix-de-Berny. The new laboratories have been equipped with the latest means of investigation—radio-active isotopes, infrared, visible light and ultra-violet spectrographs, Raman and Roentgen spectography, ultra-sound and ultra-cinematic methods, electron microscopes, etc. Including personnel in the company's testing divisions and pilot installations, the two laboratories employ about 500 persons altogether. Research projects include work on improving and developing polymerization and polycondensation plastics, and plasticizers, solvents, etc., for the plastics industry.

Now . . . Up-To-The-Minute

INTERNATIONAL TECHNICAL ASSISTANCE

- To tire and other rubber manufacturers abroad, who desire to learn the latest American "Know-How" . . . cut manufacturing costs—we offer comprehensive Technical Assistance at low cost.
- Dayton Rubber's I.T.A. plan has been in existence for 20 years. Rubber experts and teachers that give unexcelled technical assistance at a surprisingly nominal cost . . . all backed by 48 years of recognized leadership in the rubber industry . . . with 4 U. S. plants.
- We train your personnel in these modern plants . . . help you establish the latest formulae for processing natural and all new types of synthetic rubbers and textiles . . . latest "Know-How" in Tubeless Tires, Butyl Tubes, Rayon and Nylon Cords, Carbon Blacks. We also design factories and supervise machinery installations if desired.

Write: International Technical Assistance Division

International Technical Assistance Division I.T.A. The Dayton Rubber Co. Dayton, Ohio

Dayton Rubber

Dayton 1, Ohio, U. S. A.
Cable Address: Thorobred

SINCE 1905, MANUFACTURERS OF TIRES AND TUBES

Thomaston Fabrics

A DEPENDABLE SOURCE OF SUPPLY FOR
INDUSTRIAL TEXTILES

FOR THE
RUBBER INDUSTRY

SUCH AS:

TIRE FABRICS • HOSE AND BELT DUCKS • YARNS
CHAFERS • THREADS • SHEETINGS • LAMINATING FABRICS
DIVERSIFIED COTTON FABRICS. Whatever your needs our Industrial Textile Specialists will be glad to discuss them with you. We solicit your inquiries.

THOMASTON MILLS

Thomaston, Georgia • New York Office: 40 Worth St.
Akron, Ohio Office: 308 Akron Savings & Loan Bldg.

Special MAGNESIUM OXIDES FOR NEOPRENE COMPOUNDING

MAGLITE-M*
A top curing aid • Has better acid acceptance, anti-scorch properties, uncured stock life • Safer tubing at higher die temperatures • Faster tubing and wire covering • Better molding characteristics.

MAGLITE-D*
All the advantages of MAGLITE-M and with these added values.
Easier incorporation into neoprene • Greater bulking factor per cubic foot • Higher magnesium content.
*Products of the Marine Magnesium Division of Merck & Co.

Call on Whittaker "The Talc House"

WHITTAKER CLARK & DANIELS, INC.
260 West Broadway
New York 13, N. Y.

RMP
ANTIMONY
FOR RED RUBBER

....The utmost in pleasing appearance with no deteriorating effect whatever.

RARE METAL PRODUCTS CO.
ATGLEN, PA.

FAR EAST

MALAYA

Reactions to China/Indonesia Rubber Deal

During the first week of December the rubber market in Singapore moved within rather narrow limits, with, on the whole, a certain upward tendency induced by rumors of a China/Indonesia rubber deal and, later, by news of impending favorable reconsideration of American rubber policy. In the early part of November the report that Indonesia was to resume rubber sales to China and that a trade mission was on its way to Peking to handle details had been greeted with enthusiasm in Singapore that found expression in a rising market. Reports varied as to the amount of rubber China would buy and went as high as 130,000 tons. Actually, it seems that the ambassador for Communist China had notified Indonesia that his government was prepared to buy 2,000 to 3,000 tons a month. At the time a six-man Indonesian Trade Mission was already in Hong Kong, on its way to Peking to discuss the export of a wide variety of Indonesian products to China, including rubber, tea, and petroleum.

As the days went by and it became apparent that details had still to be worked out and arrangements made, and that moreover the amount of rubber likely to be involved was not so large as supposed, the early enthusiasm gave way to disappointment, and a dull market followed. Up to the first week of December it had still not become known whether an agreement on rubber had been signed by China and Indonesia or not, but rumors were rife.

Meanwhile rubber circles in Malaya had been agitated by the prospect that now Indonesia was to join Ceylon in reaping the benefits of a rich deal in a market from which Malaya was still cut off by destinational control. It was pointed out that with the truce in Korea the time had come to free rubber for export to China; such action was further justified by the failure of the United States to live up to its promises to buy more natural rubber and by the cheapness of government produced synthetic rubber, factors which had depressed the price for natural rubber, it was stressed.

Smallholders on the Rubber Producers' Council sent a petition to the United States House of Representatives Armed Services subcommittee, explaining the hardships they are suffering because of the low world prices for rubber. Most of the smallholders own only a few acres; at present price levels thousands having three acres in tapping earn only about $60 (Straits currency) a month, an income not conducive to contentment with the existing cost of living what it is, and these people would be particularly susceptible to Communist propaganda.

The desirability of selling rubber to China also came up in the British House of Commons; Heathcote Amory, Minister of State, Board of Trade, was asked whether in view of the fall of rubber prices in the Far East, he would consider lifting the ban on the sale of rubber to China and put it on the same basis as the sale of rubber to Russia. Mr. Amory replied that the embargo could not be lifted without breach of United Kingdom obligations under the UN resolutions of May, 1951. He added that reconsideration of the embargo, in concert with UN countries, must depend on developments in the Far East.

Malaya Not Hurt by Embargo?

A Chinese correspondent of the *Malay Mail* took what, under the circumstances, may be considered a novel stand on the subject of raising the ban on rubber exports to China. He quoted Rubber Study Group statistics to show that the removal of the embargo might not yield the golden results which most rubber men seem to expect from such a step. The figures in question indicate that despite the fact that Ceylon has made rubber freely available to China, the total new rubber supplies to Russia and China together have decreased. In 1950, before the embargo, new supplies to the two countries were estimated at a total of 152,500 long tons. In 1951, which saw the introduction of the ban, the total new supplies to them came to 136,300 long tons, and in 1952, to 145,800 tons; in both years the figures include Ceylon rubber. In 1953, in spite of the rubber/rice pact with Ceylon, new supplies were being acquired by Russia and China at the annual rate of altogether 128,000 tons. The conclusion is therefore arrived at that it is doubtful whether destinational control for Malayan rubber has actually been shutting Malaya off from a demand by Communist China.

Incidentally, it is to be noted, that recent figures seem to indi-

cate that any increase in purchases of rubber by one Communist country is promptly followed by decreased buying in another. It is perhaps also salutary to consider that even an awakening China, with a population close to 500,000,000, is not likely to require any considerable amounts of rubber for its numerous civilians for many years to come.

Trade with Japan

Malaya and Indonesia seem to be vieing with each other for the lion's share of the growing rubber business with Japan, and now one, then the other, is ahead. Thus in the first eight months of 1953, the score was: 26,519 tons of Malayan rubber, and 28,244 tons of Indonesia rubber, to Japan. A few months later Malaya had resumed the lead, with shipments to Japan amounting to 35,469 tons for the first 10 months; while Indonesia had sent a total of 34,280 tons in the same period.

These figures at the same time illustrate the progress the Japanese industry is making. The rubber imports from the two sources named came to 69,749 tons in the first 10 months of 1953, as compared with total shipments of 67,164 tons from all sources in 1952. The Tokyo estimate of total rubber imports by Japan for 1953, at 95,000 tons, does not appear excessive.

Because Malayan rubber is cheaper and better in quality than Indonesian rubber, Japan would prefer to buy the former, said S. Suzuki, president of Taisei Rubber Industry, Ltd., one of Japan's important rubber manufacturers, who visited Malaya late in November. Japan could use 20% more rubber than at present if a reasonable market were available for her manufactured goods, he added.

Mr. Suzuki, together with the manager of his company, had come to Malaya to conduct some investigations in connection with future plans. His firm is producing 500,000 bicycle tires and tubes annually and uses 80 tons of rubber and 20 tons of latex monthly.

A nine-man rubber mission from Japan is expected to arrive in Malaya in January, 1954. The mission, the first to visit Malaya since the war, plans to negotiate purchases of Malayan rubber and also to discuss packing problems.

Production Figures

Rubber output in Malaya the first nine months of 1953 totaled 424,018 tons, or 4,390 tons below the 428,408 tons produced in the 1952 period. The decrease was wholly due to lower production by smallholders, which came to only 172,016 tons in the 1953 period, against 184,592 in the corresponding period of 1952. On the other hand, estate outputs increased by 8,186 tons to 252,002 tons. With continuing low price levels, smallholder production is expected to decline still further.

In the period under review, Malaya produced 5,165 tons of special rubbers, of which 4,787 tons were non-standard grades prepared according to patented or technically specified procedure, and the balance was softened rubber, including rubber containing peptizers.

Average yields per tapped acre per annum worked out at 355 pounds for ordinary rubber, and 795 pounds for high-yielding rubber, with an average for all rubber amounting to 470 pounds per acre per annum.

Malayan Buffer Stock Proposed

Soon after the Rubber Study Group meeting in London recommended the creation of new natural rubber stocks and additions to existing stocks, it was proposed here to start Malaya's own rubber buffer stock. The idea has not received much support in Kuala Lumpur, at least, where it was pointed out that the scheme, as outlined by its sponsors, would be too expensive for the Federation Government to carry out at this time when it was already faced by a heavy budget; further that the United States could wreck the scheme if it chose, and finally that it is Indonesia which has most of the surplus rubber. Indonesia is estimated to have a surplus of more than 100,000 tons of rubber.

"Kel-F Buyers Guide." M. W Kellogg Co., Jersey City, N. J. 16 pages. Sources of Kel-F polymer materials, finished products, and application services offered by more than 75 United States and Canadian companies are contained in this booklet

MIDAS® process

VULCANIZING TIME: UNDER 4 MINUTES!

UNUSUAL, LONG-WEARING FOOTWEAR CAN NOW BE PRODUCED AT AMAZINGLY LOW COST

A tremendous potential market exists in every country for practical, rugged footwear that can be purchased at a price equivalent to three hours' earnings. In some countries, MIDAS footwear could be retailed profitably for less than one hour's pay!

No complicated shoe-making machinery necessary. Rubber sole is shaped, cured and vulcanized directly to upper all in one operation.

TECHNICAL ASSISTANCE ARRANGEMENTS FOR THIS FOOTWEAR AVAILABLE FOR SEVERAL COUNTRIES

Write today for further details. (Correspondence in any language.)

RO-SEARCH, Inc. Specialists in Technical Assistance Since 1932

Licensors of the famous "FOAMTREAD" process

Waynesville, North Carolina, U.S.A. Cable Address: ROKAKO

SPECIAL INDUSTRIAL FABRICS for the RUBBER INDUSTRY

FLIGHTEX FABRIC REGISTERED U.S. PAT. OFFICE

• COTTON • VINYON • DYNEL • ORLON • GLASS

If you use special industrial fabrics you'll find Flightex a dependable source of supply. Our staff of engineers is at your service to help solve your fabric problems.

Write for Complete Information

FLIGHTEX FABRICS, Inc.
93 Worth Street New York 13, N. Y.

CROWN CLAY

SOUTHEASTERN CLAY CO.
AIKEN, SOUTH CAROLINA

Sales Agents

HERRON BROS. & MEYER ..... Akron
HERRON BROS. & MEYER ..... New York
C. M. BALDWIN ..... Chicago
ERNEST JACOBY & CO. ..... Boston
The C. P. HALL CO. of Calif. ..... Los Angeles
THE PIGMENT & CHEMICAL CO., LTD. ..... Toronto

CONSULTANTS & ENGINEERS

BERLOW AND SCHLOSSER CO.
Consultation and Technical Service
Paper, Textile and Wringer Rolls—Mechanicals
Molded Specialties—Cut Rubber Thread
401 INDUSTRIAL TRUST BUILDING
PROVIDENCE 3, R. I.

G. F. BUSH ASSOCIATES PRINCETON, N. J. BOX 175
Our Testing Division—Rubber Section
now offers a complete rubber testing service including
OZONE CRACKING
Send for full information, including costs. Specify complete tests requirements, e.g., ASTM D-1149-51T

RUBBER TECHNOLOGY COURSES
Advanced Diploma Courses in the Industrial Chemistry and Technology of (a.) Rubber Manufacturing (b.) Latex Manufacturing (c.) Plastics Manufacturing, in residence and by correspondence. Consulting Services Included. Write for details:
GIDLEY RESEARCH INSTITUTE
FAIRHAVEN, MASS. • U. S. A.

HALE & KULLGREN, INC.
Specialists in Processes and Plants for Rubber and Plastics.
A Complete Engineering Service
including: Economic Surveys; Process Design; Installation; Contracting and Operation.
613 E. Tallmadge Ave., Akron 10, Ohio

FOSTER D. SNELL, INC.
Natural & Synthetic Rubber Technology
Compounding—Trouble Shooting—Testing
A personal discussion of your problems is suggested.
29 W. 15th St., New York 11, N. Y. WA 4-8800

Editor's Book Table

BOOK REVIEWS

"Formaldehyde." Second Edition. J. Frederic Walker. American Chemical Society Monograph Series, No. 120. Reinhold Publishing Corp., 330 W. 42nd St., New York 36, N. Y. Cloth, 6 by 9 inches, 591 pages. Price, $12.

Brought up to date and completely revised, this monograph gives a systematic summary of the salient facts and theories of formaldehyde chemistry, with special attention to the developments in the field since the publication of the first edition in 1944. The text covers the production of formaldehyde; the physical and thermodynamic properties of formaldehyde monomer, solutions, and polymers; the chemical properties of formaldehyde and its reactions with various types of organic and inorganic chemicals; formaldehyde detection and analysis; hexamethylenetetramine; and the industrial applications of commercial formaldehyde substances (including use in rubber, latex, and resins). Extensive use is made of bibliography references, which have been evaluated for accuracy and significance, and there are comprehensive author and subject indices.

"The Handbook of Solvents." Leopold Scheflan and Morris B. Jacobs. D. Van Nostrand Co., Inc., 250 Fourth Ave., New York 3, N. Y. Cloth, 6½ by 9½ inches, 736 pages. Price, $10.

A cross-indexed alphabetic listing of more than 2,700 liquid organic solvents is given in this book. Each solvent is shown with its synonyms, formula, molecular weight, boiling or melting point, flash point, specific gravity, solubility, and uses. Adding to the value of the book are introductory chapters covering the classification of solvents; safe practices in the use of solvents; solvent action and power; vapor pressure; dilution ratios; limits of inflammability; and solvent recovery. A list of data sources is also included, as is a comprehensive index of solvent synonyms.

"Stewart's Scientific Dictionary." Fourth Edition. Jeffrey R. Stewart, assisted by Frances Elizabeth Spicer. Published by Stewart Research Laboratory, Forest Gate at Franconia, Alexandria, Va. Cloth, 6 by 9 inches, 788 pages. Price: $10.50 domestic; $12.50 foreign.

This new edition of what was previously titled, "The National Paint Dictionary," incorporates a major change in scope in that the subject matter is no longer restricted to terms and materials used in the coating field. Instead, this new book attempts to cover the chemical process industries, including such fields as rubber, plastics, adhesives, packaging materials, soaps, detergents, textiles, industrial chemicals, petroleum, coatings, and others. While admittedly not comprehensive in coverage, the book will serve as a handy reference to terms, chemicals, and common chemical products used in the process industries.

NEW PUBLICATIONS

"Basic Comparisons of Carbon Blacks in Various Polymers." Bulletin No. 24. Phillips Chemical Co., 318 Water St., Akron, O. 12 pages. The properties imparted to six commonly used polymers by eight blacks of various classifications are compared. The polymers include natural rubber; hot, cold, and oil-extended GR-S; neoprene; and nitrile rubber.

"1954 Condensed Reference File of Bakelite and Vinylite Plastics and Resins." Bakelite Co., New York, N. Y. 12 pages. Technical information on the properties of more than 50 plastics and resins, their particular industrial or commercial applications, and their ability to be molded, extruded, calendered, or otherwise formed in manufacturing processes are contained in this illustrated folder.

"Protection with Parlon." Hercules Powder Co., Wilmington, Del. 22 pages. Thirty-five case histories of the successful use of protective coatings based on chlorinated rubber, and instructions for applying Parlon paints by brush or spray to metal, wood, and various cement and asphalt surfaces are contained.

"**B. F. Goodrich Shoe Products.**" Shoe Products, B. F. Goodrich Co. Industrial Products Division, 500 S. Main St., Akron, O. 44 pages. This catalog illustrates and describes the complete line of approximately 3,800 shoe products of the company for the manufacture and repair of shoes.

"**Silastic Newsletter.**" Vol. I, No. 5, Nov.-Dec., 1953. Dow Corning Corp., Midland, Mich. 5 pages. Information on the hot air vulcanization of some Silastic materials as they are extruded; on the effect of temperature on the durometer reading of Silastics 50 and 80; on the resistance of Silastics to hot oils and to weathering; and on markets for Silastic products are contained in this catalog insert.

"**Rubber Processing & Equipment.**" J. H. Day Co., Inc., Cincinnati, O. 66 pages. This booklet is a composite of text material on general rubber processes and data sheets which give specifications on Day equipment for the industry. The applications of sifters, mixers, kneading machines, blenders, and roll mills in the production of reclaim rubber, pigments, rubber cements and adhesives, and compounds such as asphalt, wax, etc., are discussed.

"**Pycal Plasticizers in Poylvinyl Acetate Emulsion Adhesives.**" Atlas Powder Co., Wilmington, Del. 24 pages. Test data on physical properties, chemical properties, resistance to water spotting in films, and viscosity and permanent tack of the plasticizers in various polyvinyl acetates are given along with formulations for using the Pycals in representative types of applications.

"**How to Make Power Plant Cleaning Easier.**" Oakite Products, Inc., New York, N. Y. 42 pages. This handbook, three by eight inches in size, discusses the most common power plant cleaning and descaling and paint stripping problems, with data on methods, solution concentrations, and temperatures used in the various applications.

"**Rubber in a Nutshell.**" 1954. Communication No. 220. Rubber-Stichting, Postbox 66, Oostsingel 178, Delft, Holland. 18 pages. (Available in the United States through the Natural Rubber Bureau, 1631 K St., N.W., Washington, D. C.) This 2½- by four-inch booklet presents statistics, ranging from world production of rubber over the past 43 years to the influence of fillers on the properties of vulcanized rubbers, in graphic and tabular forms.

"**Model FGT Baldwin-Emery SR-4 Universal Testing Machine.**" Bulletin 4206. Baldwin-Lima-Hamilton Corp., Philadelphia 42, Pa. 8 pages. This testing machine of 50,000-pound capacity and featuring a novel weighing system, sturdy construction, automatic operation, and multiplicity of uses is discussed.

"**Color-Control Stabilizer for Vinyl Resins—Staflex OY.**" Deecy Products Co., Cambridge, Mass. 3 pages. The recipes used and the properties resulting from incorporation of this material in PVC are given. Staflex OY is a liquid cadmium salt recommended for use only as a supplement to rapid acid absorbers.

"**Rubber and Plastics Used in the Printing Industry.**" PL-3. Research & Engineering Council of the Graphic Arts Industry, Inc., Washington, D. C. Paper, 8½ by 11 inches, 24 pages. Price, $3. Intended as a broad guide both to the industry and to manufacturers and suppliers of rubber and plastic materials, this brochure outlines the use of these materials in printing applications. The preparation and use of rubber printing plates, including types, molds, handling, and limitations, and of plastic plates (thermosetting and thermoplastic), including inks, adhesives, molds, etc., are described in detail.

"**Hycar Latex Newsletter.**" Issue No. 5. B. F. Goodrich Chemical Co., Rose Bldg., Cleveland 15, O. 3 pages. Discussed in this "letter" are the following subjects concerning Hycar latices: film properties; deodorants; mechanical stability of 4501 latex; shelf life of various blends; and heat stability.

"**Hycar Technical Newsletter.**" Vol. 2, No. 11. 4 pages. This catalog insert is devoted exclusively to a discussion of the properties, recipes, immersion data, etc., of Hycar 1012X41, a liquid nitrile polymer.

save steps!
save time!
save headaches!
with

NYQ INTERMEDIATES

PERHAPS ONE OF THESE WILL HELP

Allethrolone	4-Hydroxycoumarin
Allyl Acetone	Methallyl Acetone
Benzalacetone	Methylisoamylacetoacetate
3-Carbethoxy-4-Hydroxycoumarin	N, N' Dibenzylethylene-diamine Diacetate
4-Chloro-6-Methoxyquinoline	n-Octyl Bromide
Citrazinic Acid Tech.	n-Octyl Mercaptan
2,5-Dimethyl-1, 5-Hexadiene Tech.	Para-Tolyl Acetic Acid
2,5-Dimethyl-2, 4-Hexadiene Tech.	Phenyl Trimethylammonium Sulfate Solid
Di-n-Propyl Maleate	Phenyl Trimethylammonium Hydroxide Solution 20-25%
Diphenylacetonitrile	Potassium Methyl Sulfate
Ethyl-3-Oxo-6-Heptenoate	Quininic Acid
Hemipinic Acid	Stearoxyacetic Acid

We invite your inquiries for these experimental chemical intermediates.

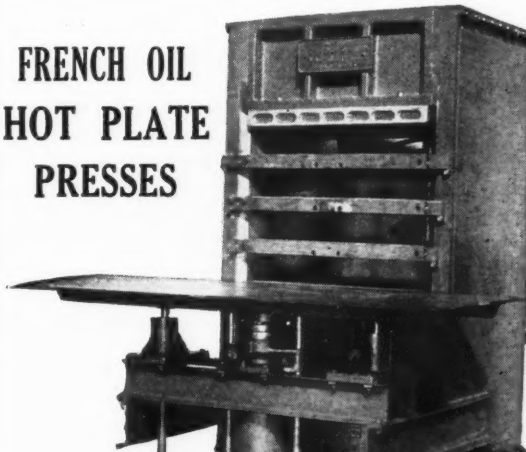
Samples are available on your request. For prompt action, call

THE FULL LINE FINE CHEMICAL HOUSE

THE NEW YORK QUININE & CHEMICAL WORKS, INC.

50 Church St. New York 8, N.Y. • 729 West Division St. Chicago 10, Ill. • 6399 Wilshire Blvd. Los Angeles 48, Calif.

FRENCH OIL HOT PLATE PRESSES



2435

Side plate or column presses for compression or transfer or injection molding of rubber and allied synthetics.

Write for bulletins on "Modern Hydraulic Presses."

***The* FRENCH OIL MILL MACHINERY CO.**
PIQUA, OHIO

TJIPETIR WHITE GUTTA PERCHA

the outstanding material for

GOLF BALL COVERS—

HIGH FREQUENCY INSULATION—BELTING, etc.

again available in limited quantities

for prices and details apply

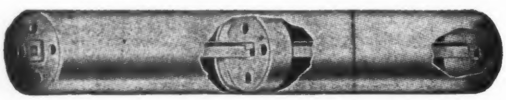
JACOBUS F. FRANK

Repr. INDONESIAN GOVT. ESTATES

120 Wall Street • New York 5, N. Y.

Telephone: WHitehall 3-0663

STEEL CALENDER STOCK SHELLS



ALL STEEL, ALL WELDED CONSTRUCTION, with forged steel hubs for 1¼", 1½" and 2" square bars. 4", 5", 6", 8", 10", 12", 15", 20" and 24" diameters. Any length. Also Special Trucks (Leaf Type) Racks, Tables and Jigs.

Used in manufacturing rubber and plastic products.

THE W. F. GAMMETER COMPANY

CADIZ, OHIO

THE ALUMINUM FLAKE COMPANY

AKRON 14, OHIO

Manufacturers of

ALUMINUM FLAKE

A COLLOIDAL HYDRATED ALUMINUM SILICATE

REINFORCING AGENT for

SYNTHETIC and NATURAL RUBBER

New England Agents — Warehouse Stocks

BERLOW AND SCHLOSSER CO.

401 INDUSTRIAL TRUST BUILDING

PROVIDENCE 3, RHODE ISLAND

TESTED IS TRUSTED

MODEL X Tensile Tester

One of the many *Scott Testers for "World-Standard" testing of rubber, textiles, plastics, paper, wire, plywood, up to 1 ton tensile.

SCOTT TESTERS

*Trademark

SCOTT TESTERS, INC.

90 Blackstone St., Providence, R. I.

"Viscosity Measurements with the Brookfield Viscometran Viscosity Transmitter and Foxboro Capacity Dynalog Receiver." Technical Information 27-A-16b. Foxboro Co., Foxboro, Mass. 4 pages. The methods by which an accurate measurement of viscosity under industrial conditions is made is described in this catalog insert with diagrams and text.

"ADM Fatty Alcohols: Adols and Unadols." Technical Bulletin No. 903-A. Archer-Daniels-Midland Co., 2191 W. 110th St., Cleveland 2, O. 10 pages. This bulletin covers the complete line of the company's fatty alcohols, with contents of the chemical structure and composition, reactions, applications, and solubility data on standard Adols as well as new Adols and Unadols recently introduced in pilot-plant quantities.

"The Marketing Phases of Development and Research." R. P. Dinsmore. Goodyear Tire & Rubber Co., Akron, O. 8 pages. This publication is a reprint of an address given before the Marketing Section of the American Chemical Society in New York, N. Y., October 21, 1953. The functions of research and development, including its limitations and potentialities, were discussed, and the steps followed, from the selection of products and markets, through research, pilot plant, and production, to the use of marketing aids were covered in some detail by Dr. Dinsmore.

"Weigh-Feed with Glengarry's Injecto-Weigh." Glengarry Equipment Corp., Bay Shore, N. Y. 4 pages. The specifications, uses, and economics of this machine, designed to be mounted on to plastic injection molding units, are described in this booklet.

"Kel-F, Nylon, Teflon." Flek Corp., Los Angeles, Calif. 4 pages. This illustrated brochure describes the company's services and facilities for precision molding and extrusion of Kel-F, nylon, and Teflon.

"Quaker Water Hose." Quaker Rubber Corp., Philadelphia, Pa. 4 pages. This catalog insert describes, with photographs, cut-a-way sections, and tables on sizes, working pressures, and weights, the various hose manufactured by the company.

"A Few Case Histories." Arthur D. Little, Inc., Cambridge, Mass. 16 pages. As the title implies, this palm-sized brochure contains a random sampling of cases in which this industrial research and engineering firm has participated.

Publications of the Celanese Corp. of America, New York, N. Y.

"Celanese Acetate Sheeting and Film." 4 pages. This folder discusses the principal markets for these materials and provides a table of properties for both the film and the sheeting.

"Celanese Molding Plastics." 14 pages. This illustrated, semi-technical booklet, designed for injection and extrusion molders, describes the six formulation series of molding materials available from the company, with their ASTM flow characteristics, physical properties, etc.

"Program for Liquidation: What the RFC Holds, How It Is Liquidating." Reconstruction Finance Corp., Washington 25, D. C. 40 pages. All assets of the RFC, including those concerned with synthetic rubber, are described, and details given of an active liquidation program for disposal.

"Determination of Mooney Viscosity of the Contained Polymer in Latices." Revised Test Method E-8-a. 1 page. This insert is intended for inclusion in "Specifications for Government Synthetic Rubbers, Revised Edition," October 1, 1952.

"Flexamine—A Superflexing Antioxidant." Compounding Research Report No. 26. Naugatuck Chemical Division, United States Rubber Co., Naugatuck, Conn. 14 pages. The use of this product in the compounding of various rubbers such as neoprene and GR-S for camelback, shoe soling material, etc., is described, with recipes and resulting physical properties.

"Rubber Chemicals: M-B-T, M-B-T-S, and O-X-A-F—Naugatuck Thiazole Accelerators." Compounding Research Report No. 27. C. W. Lawson and F. L. Holbrook. Naugatuck Chemical Division. 16 pages. The recipes and test data resulting from use of these accelerators in various types of rubbers are contained along with the chemical and physical properties of the chemicals themselves.

BIBLIOGRAPHY

Survey of Sebacic Acid. *Rubber Age (London)*, May, 1952, p. 117.

Recent Developments in Rubber Compoundings. J. H. Carrington, *Rubber Age (London)*, May, 1952, p. 120.

Additional Aspects of British Carbon Black Technology. H. J. Collyer, *Rubber Age (London)*, May, 1952, p. 121.

Recent Progress and Developments in Reclaiming. W. E. Stafford, R. A. Wright, *Rubber Age (London)*, May, 1952, p. 132.

Pliofilm. *Rubber Age (London)*, May, 1952, p. 143.

Recent Neoprene Developments. J. F. E. Ruffell, *Rubber Age (London)*, May, 1952, p. 145.

Rayon and the Tire Industry. J. K. Berry, *Rubber Age (London)*, May, 1952, p. 153.

Whither Foam Rubber? F. C. Jennings, *Rubber Age (London)*, May, 1952, p. 157.

Modern Rubber Adhesives. A. Bramley, *Rubber Age (London)*, May, 1952, p. 160.

The Production of Dipped Articles from Latex. F. W. Warren, G. R. Edwards, *Rubber Age (London)*, May, 1952, p. 162.

Continuous Extrusion and Coagulation of Latex for the Production of Latex Thread. R. G. James, *Rubber Age (London)*, May, 1952, p. 167.

The Cold Casting Process for Latex, Using Plaster Molds. A. A. Round, *Rubber Age (London)*, May, 1952, p. 169.

Recent Developments in Rubber to Metal Bonding. W. D. Rae, *Rubber Age (London)*, May, 1952, p. 173.

High Styrene-Butadiene in Leather-Like Soling Compounds for Footwear. *Rubber Age (London)*, May, 1952, p. 175.

Adhesives. H. J. Stern, *Rubber Age (London)*, May, 1952, p. 176.

Factice: Its Use and Function in Rubber Technology. J. B. Harrison, *Trans. Inst. Rubber Ind.*, June, 1952, p. 117.

Mechanism of the Gelling of *Hevea* Latex by Zinc Compounds. G. M. Kraay, M. van den Tempel, *Trans. Inst. Rubber Ind.*, June, 1952, p. 144.

Mechanical Handling of Molds. F. Skelton, *India Rubber J.*, June 7, 1952, p. 7; June 14, p. 9.

Studies of Tire Performance. *Natl. Bur. Standards Tech. News Bulletin*, June, 1952, p. 88.

Highly Cross-Linked Polybutadiene. J. A. Coffman, *Ind. Eng. Chem.*, June, 1952, p. 1421.

Separation of Gases by Means of Permeable Membranes. D. W. Brubaker, K. Kammermeyer, *Ind. Eng. Chem.*, June, 1952, p. 1465.

Applications of the Stacomizer Press in Various Stages of Rubber Processing. J. D. Keane, F. W. Bickel, *Rubber Age (N. Y.)*, June, 1952, p. 349.

New Applications of Rubber on Decks of Naval Vessels. E. F. Greenleaf, *Rubber Age (N. Y.)*, July, 1952, p. 495.

The Surface Coating and Impregnation of Fabric. C. A. Litzler, *Rubber Age (N. Y.)*, July, 1952, p. 501; Aug., p. 631; Sept., p. 781.

Mechanical Goods Presses. L. E. Soderquist, *Rubber Age (London)*, July, 1952, p. 238.

Teflon Tetrafluoroethylene Resin Dispersion. J. F. Lontz, W. B. Happoldt, Jr., *Ind. Eng. Chem.*, Aug., 1952, p. 1800. J. F. Lontz, J. A. Jaffe, L. E. Robb, W. B. Happoldt, Jr., *Ibid.*, p. 1805.

Douglas Frank Twiss. E. A. Murphy, *Rubber Chem. Tech.*, Apr.-June, 1952, p. 187.

Abrasion Resistance of GR-S Vulcanizates. J. W. Adams, J. A. Reynolds, W. E. Messer, L. H. Howland, *Rubber Chem. Tech.*, Apr.-June, 1952, p. 191.

Studies of the Vulcanization of Rubber. S. Kambara, K. Ohkita, *Rubber Chem. Tech.*, Apr.-June, 1952, p. 209. **X.** B. A. Dogadkin, F. Keifetz, *Ibid.*, July-Sept., 1953, p. 559.

Diffusion of Oxygen and Oxidation of Rubbers in the Presence of Phenyl-Beta-Naphthylamine. A. S. Kuzminskii, L. L. Shanin, N. N. Lezhnev, *Rubber Chem. Tech.*, Apr.-June, 1952, p. 230.

Studies of the Mechanism of Mastication of Rubber. III. M. Imoto, *Rubber Chem. Tech.*, Apr.-June, 1952, p. 234. **V.** M. Imoto, S. Kiriyama, *Ibid.*, Jan.-Mar., 1953, p. 91.

Investigations of the Reversion of Vulcanized Rubber under Heat. U. Shankar, *Rubber Chem. Tech.*, Apr.-June, 1952, p. 241.

X-Ray Analysis of the Molecular Structure of Rubbers. X-Ray Diffraction of Amorphous Rubber. V. I. Kasatochkin, B. V. Lukin, *Rubber Chem. Tech.*, Apr.-June, 1952, p. 258.

An Improved Apparatus for Determining Moisture in Rubber by Distillation with Toluene. M. Tryon, *Rubber Chem. Tech.*, July-Sept., 1952, p. 704.

tire molds

special machinery

tear test equipment

fair prices

reliable delivery

good workmanship

your inquiries are solicited

THE AKRON EQUIPMENT CO.

Akron 9, Ohio

Eagle-Picher pigments

serve the rubber industry across the board

Eagle-Picher manufactures a comprehensive line of both lead and zinc pigments for the rubber industry. The quality and uniformity of our pigments, exact quality control methods of manufacturing, more than a century of experience . . . are the factors that make Eagle-Picher *serve you better.*

Zinc Oxides • Basic White Lead Silicate
Basic Carbonate of White Lead
Sublimed White Lead
Litharge • Sublimed Litharge
Red Lead (95%, 97%, 98%)
Sublimed Blue Lead

On the Pacific Coast:

Associated Lead & Zinc Co.
2700 16th Avenue, S. W.
Harbor Island, Seattle 4, Washington

EAGLE EP PICHER

THE EAGLE-PICHER COMPANY
Since 1843
GENERAL OFFICES: CINCINNATI (1), OHIO

MARKET REVIEWS

RUBBER

LIGHT to moderate trading and small price gains despite fluctuations featured both the rubber spot and futures markets during the period from November 16 to December 15. After a slow start, prices began to advance late in November following the revoking on November 22 of the government order designed to prevent domestic consumption of synthetic rubber from falling below 510,000 tons a year.

Offerings of rubber on the spot market were light during this price rise, with the lower grades being held back by the growers as they awaited further Washington developments on a possible temporary halt to rotation selling from government stockpiles. On December 9 the government announced a new policy to reduce stockpile rotation of natural rubber from the previous rate of 10,000 tons a month to a new rate of 5,000 tons a month, effective in April. The order brought a sharp break in rubber prices, since natural rubber growers and importers had been expecting a much stronger move, and the letdown they felt was reflected in their trading.

The net result, as evidenced at the end of the period, was an easing of prices on the higher grades and a marked firming of prices for the lower grades so that price differentials narrowed appreciably. For example, the price differential between #1 Ribbed Smoked Sheets and #3 Amber Blankets went from 3¾¢ at the start of the period to 2⅝¢ at the end of the period.

New York Spot Market
Week-End Closing Prices

	Sept. 26	Oct. 31	Nov. 21	Nov. 28	Dec. 5	Dec. 12
R. S. S.						
#1	22.88	20.75	20.63	21.25	21.75	21.25
2	22.13	20.00	19.75	20.38	21.13	20.50
3	21.25	19.00	18.75	19.38	20.25	19.63
Latex Crepe						
#1 Thick	28.00	25.38	25.75	26.38	26.88	26.25
Thin	24.88	23.00	22.88	23.38	23.75	23.25
#3 Amber Blankets	19.38	17.00	16.88	17.38	18.25	18.38
Thin Brown Crepe	18.50	16.13	16.13	16.63	17.38	17.75
Flat Bark	17.25	15.25	15.00	15.50	15.75	15.75

The spot price for #1 Ribbed Smoked Sheets started the period at the low of 20.50¢, rose to 22.13¢ on December 8-9, and closed at 20.88¢ on December 15. No. 3 R.S.S. began the period at 18.75¢, reached a high of 20.63¢ on December 8-9, and closed at 19.88¢. November monthly average spot prices for certain grades were as follows: #1 R.S.S., 20.70¢; #3 R.S.S., 18.91¢; #3 Amber Blankets, 16.98¢; and Flat Bark, 15.20¢.

Commodity Exchange
Week-End Closing Prices

Futures	Sept. 26	Oct. 31	Nov. 21	Nov. 28	Dec. 5	Dec. 12
Mar.	22.60	20.60	20.30	21.20	21.50	20.65
May	22.60	20.50	20.30	21.30	21.50	20.70
July	22.60	20.50	20.30	21.30	21.50	20.70
Sept.	22.60	20.55	20.35	21.35	21.55	20.75
Dec.	22.60	20.55	20.40	21.39	21.55	20.75
Total weekly sales, tons	2,060	1,900	1,980	2,150	1,240	1,270

March futures started the period at 20.35¢, fell back to a low of 20.10¢ on November 19, rose to a high of 21.65¢ on December 8, and closed at 20.65¢ on December 15. Other futures prices showed similar movement, and the light trading was reflected in the 3,320 tons sold during the first half of December. Sales in the second half of November amounted to 4,270 tons, making a total for the month of 6,860 tons.

Latex

WHILE prices for bulk *Hevea* latex held at the 29¢ a pound, dry solids, level, demand for spot and nearby deliveries fell off during the period from November 16 to December 15. While consumption continued at respectable levels, consumers appeared to have overbought during the spurt of the preceding period, and indications, based on forward contracts, are that inventories will not be used up until March. Accordingly, purchases of latex for January and February delivery are for small quantities.

Final September and preliminary October domestic statistics on natural and synthetic rubber latices are given in the following table:

(All Figures in Long Tons, Dry Weight)

	Production	Imports	Consumption	Month-End Stocks
Natural latex:				
Sept.	0	6,127	5,504	11,370
Oct.*	0	6,000	5,734	11,234
GR-S latices:				
Sept.	3,449	69	3,599	4,794
Oct.*	3,639	15	3,571	3,979
Neoprene latex:				
Sept.	778	0	678	1,122
Oct.*	753	0	657	1,136
Nitrile latices:				
Sept.	582	0	†166	638
Oct.*	‡733	0	335	777

*Preliminary.
†Includes adjustment of −136 tons applicable to prior months.
‡Includes adjustment of +62 tons applicable to prior months.

RECLAIMED RUBBER

DEMAND for reclaimed rubber continued to decline during the period from November 16 to December 15. Sales of reclaim during November were estimated to be down at least 10% from those of the preceding month, and all indications were that December sales totals would be well below the November levels. The immediate outlook for the reclaim market picture is somewhat pessimistic pending a firming of natural rubber prices. On the brighter side is an apparent increase in interest in Butyl reclaim for extrusion work.

Final September and preliminary October statistics on the domestic reclaimed rubber industry are now available. September figures, in long tons, were: production, 23,360; imports, 109; consumption, 22,409; exports, 894; and month-end stocks, 30,147. Preliminary totals for October, in long tons, follow: production, 23,412; imports, 92; consumption, 21,781; exports, 866; and month-end stocks 30,876.

No changes were made in reclaimed rubber prices during the period, and current prices follow:

Reclaimed Rubber Prices

	Lb.
Whole tire: first line	$0.10
Fourth line	.0875
Inner tube: black	.15
Red	.2425
Butyl	.125
Pure gum, light colored	.2425
Mechanical, light colored	.135

The above list includes those items or classes only that determine the price basis of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality, workability, and gravity at special prices.

SCRAP RUBBER

THE scrap rubber market remained dull during the period from November 16 to December 15. While there were no changes in market prices, quotations were generally regarded as nominal in view of the market inactivity. With the approach of the usual year-end inventory-taking period, no improvement in demand can be looked for until after the first of the year, and even then the outlook is not too favorable.

Following are dealers' selling prices for scrap rubber, in carload lots, delivered to mills at the points indicated:

	Eastern Points	Akron, O.
	(Per Net Ton)	
Mixed auto tires	$11.00	$12.00
S. A. G. auto tires	Nom.	Nom.
Truck tires	Nom.	15.00
Peelings, No. 1	40.00	40.00/42.00
2	Nom.	24.00
3	14.00/15.00	Nom.
	(¢ per Lb.)	
Auto tubes, mixed	2.00	2.25
Black	3.25	4.00
Red	9.75	10.00
Butyl	1.75	2.00

COTTON FABRICS

TRADING in cotton gray goods was on the slow side throughout the period from November 16 to December 15. Modest sized lots of hose and belting ducks and chafer fabrics sold quite steadily for delivery up to 30-45 days ahead. Other than for single filling ducks, where some interest was shown in first-quarter deliveries, trading in other duck constructions was limited.

Sales in headlinings to the automotive industry were spotty, with deliveries running through January. Only sluggish trading took place in wide sateens and broken twills, and there were reports that some easing of prices was imminent. In general, buyers' inventories are at very low levels for most gray goods, and a strong improvement in demand is looked for after the first of the year.

Production of tire cord and fabric during the third quarter of 1953 totaled 131,000,000 pounds, a drop of 9,000,000 pounds from output for the preceding quarter. Of this total, rayon and nylon tire cord and fabric accounted for 114,000,000 pounds, continuing the trend away from cotton cord and tire fabric.

Cotton Fabrics

Raincoat Fabrics

Printcloth, 38½-inch, 64x60 *yd.*	.14
Sheeting, 48-inch, 4.17-yd.	.22
52-inch, 3.85-yd.	.23⅞

HYDROCARBON

PANAFLEX ...EP-1

PLASTICIZERS

A LOW COST PLASTICIZER OIL

for Rubber Compounding

PROPERTIES

Low Specific Gravity — Dark Viscous Liquid — Extremely High Boiling

FOR

Improved Processing — Improved Electrical Characteristics
Minimum Effect on Cure — Better Tear Resistance
Extending Vulcanizates

EXCELLENT COMPATABILITY WITH

GRS Rubbers—All Types — Buna N Type Rubbers — Neoprene Rubber

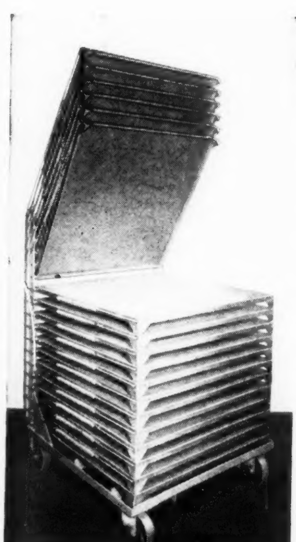
AVAILABILITY

Basic Producer — Tank Car or Drums — Warehouse Distribution

PAN AMERICAN CHEMICALS

PAN AMERICAN *Chemicals* DIVISION
Pan American Refining Corp.
122 EAST 42ND STREET · NEW YORK 17, N. Y.

SPRING LEAF TRUCK



This new Truck gives unobstructed access to three sides of each tray and offers a convenient method for storing materials that require cooling or air drying. The one piece construction Trays are spring supported and can be quickly raised or lowered, free from all locking devices. Trucks having 18 perforated trays 36" x 36" or plain surface trays 36" deep by 4 ft., 6 ft. and 8 ft. long, can be furnished either stationary or mounted on casters.

SPADONE MACHINE COMPANY, INC.

10 East 43rd St. — New York 17, N. Y.

Quality Fabrics —FOR THE

Rubber INDUSTRY

"The Preferred Source of Supply"

"SAN JUAN"® Cotton Duck

Single and Plied Yarn Chafer Fabrics
Hose and Belting Duck • Army Duck
Numbered Duck • Liner Fabrics
Enameling Ducks • Sport Shoe Fabrics
Wide Twills, Drills, Broken Twills
Selected Osnaburgs

Our technicians will gladly aid in creating industrial fabrics to your specification. We solicit your inquiries.

DEPENDABLE QUALITY FABRICS — BJB — SINCE 1900

B. J. BARRY & CO.

INCORPORATED

62 WORTH STREET • NEW YORK 13

AKRON • BOSTON • LOS ANGELES • NEW ORLEANS

MILLS AT: Lincolnton, N. C. and Roanoke, Ala.

Drills

59-inch 1.85-yd.	yd.	$0.37 /	$0.375
2.25-yd.		.325	.33

Osnaburgs

40-inch 2.11-yd.	yd.	.2425	
3.65-yd.		.1575	16

Ducks

38-inch 1.78-yd. S. F.	yd.	nom.	
2.00-yd. D. F.		nom.	
51.5-inch, 1.35-yd. S. F.		nom.	
Hose and belting		.64	

Chafer Fabrics

14.30-oz./sq. yd. Pl.	lb.	.71	
11.65-oz./sq. yd. S.		.63	
10.80-oz./sq. yd. S.		.6675	
8.9-oz./sq. yd. S.		.68	

Other Fabrics

Headlining, 59-inch, 1.65-yd., 2-ply	yd.	.4825	
64-inch, 1.25-yd., 2-ply		.6175 /	.6225
Sateens, 53-inch, 1.32-yd.		.5675	
58-inch, 1.21-yd.		62	

RAYON

DOMESTIC producers' shipments of all types of rayon during November amounted to 90,700,000 pounds, 1% below October figures. Shipments for the first 11 months of the year totaled 1,093,000,000 pounds, or 3% higher than the total for the same 1952 period. November figures for high tenacity rayon yarn were as follows: calculated production, 31,900,000 pounds or 79% of rated capacity; total shipments, 31,200,000 pounds; and end-of-month stocks, 12,700,000 pounds. A survey made by the Textile Economics Bureau, Inc., indicates that current capacity for high tenacity viscose yarn is 493,000,000 pounds per year, and is expected to increase to 520,000,000 pounds annually by July.

An analysis of high tenacity yarn shipments for the first nine months of 1953 shows that 334,718,000 pounds or 96.2% went into tires; 10,015,000 pounds or 2.9% were used in hose, belting, and other non-tire rubber products; and 3,226,000 pounds or 0.9% went into non-rubber industry products.

There were no changes in rayon tire yarn and fabric prices during the period from November 16 to December 15, and current prices follow:

Rayon Prices

Tire Yarns

1100/ 480	$0.62	$0.63
1100/ 490		.62
1150/ 490		.62
1165/ 480		.63
1650/ 720		.61
1650/ 980		.61
1820/ 980		.61
2200/ 960		.60
2200/ 980		.60
2200/1466		.67
4400/2934		.63

Tire Fabrics

1100/490/2		.72
1650/980/2	.659	.73
2200/980/2		.685

Financial

(Continued from page 526)

Thermoid Co., Trenton N. J., and subsidiaries. First three quarters, 1953: net earnings, $1,052,358, equal to $1.20 each on 800,000 common shares, compared with $654,111 or 70¢ a share, in the preceding year's quarters.

Shell Oil Co., New York, N. Y., and wholly owned subsidiaries. Nine months to September 30, 1953: net profit, $81,480,515, equal to $6.05 a share, contrasted with $62,656,651, or $4.65 a share, in the 1952 period; sales, $933,475,884, against $839,408,362.

Skelly Oil Co., Kansas City, Mo. Nine months to September 30, 1953: net income, $22,600,100, equal to $3.93 a share, against $19,855,983, or $3.45 a share, in the 1952 months.

Stauffer Chemical Co., New York, N. Y. First nine months, net profit, $4,224,556, equal to $1.80 a share; sales, $59,711,537.

Taylor Instrument Cos., Rochester, N. Y. Year ended July 31, 1953: net income, $653,241, equal to $3.62 a share, against $1,050,020, or $5.82 a share, a year earlier.

United States Rubber Co., New York, N. Y. First nine months, 1953: net income, $21,488,326, equal to $3.32 a common share, compared with $18,912,141, or $2.83 a share, in the 1952 months; net sales, $657,393,028, against $648,744,964.

Westinghouse Air Brake Co., Wilmerding, Pa., and domestic subsidiaries. First nine months, 1953: net income, $7,112,725, equal to $1.72 each on 4,124,366 common shares, against $8,064,875, or $1.96 each on 4,123,522 shares, in the 1952 period.

The Timken Roller Bearing Co., Canton, O. First nine months, 1953: net profit, $8,486,129, equal to $3.50 a share, against $7,447,111 or $3.08 a share, a year earlier.

United Carbon Co., Charleston, W. Va., and subsidiaries. First nine months, 1953: net profit, $2,860,114, equal to $3.59 a share, against $2,582,971, or $3.25 a share, in the 1952 months.

S. S. White Dental Mfg. Co., Philadelphia, Pa. First nine months, 1953: net profit, $636,259, equal to $1.76 a common share, against $578,183, or $1.65 a share, in the 1952 period.

Supply Contracts Awarded

Armed Services Textile & Apparel Procurement Agency, 111 E. 16th St., New York 3, N. Y., recently announced the awarding of the following contracts for: *rubber insulated combat boots,* 30,540 pairs, $268,565.90, to Bristol Mfg. Co., Bristol, R. I.; *boot-muluk,* 14,780 pairs, $100,946.20, also to Bristol Mfg.; *synthetic rubber coated raincoats, OD, dismounted,* 45,000, $236,550, to Marathon Rubber Products Co., Wausau, Wis., 23,025, $122,493, to Whitewater Raincoat Co., Whitewater, Wis., and 61,975, $334,665, to Archer Rubber Co., Milford, Mass.

Estimated Pneumatic Casings, Tubes, Camelback Shipments, Production, Inventory, October, September, 1953; First 10 Months, 1953, 1952

	Original Equipment	Replacement	Export	Total	Production	Inventory
Passenger Casings						
October, 1953	2,832,129	3,212,467	90,223	6,134,819	6,529,241	10,941,065
Change from previous month	—	—	—	−2.28%	+7.36%	+4.26%
September, 1953	2,503,074	3,690,756	83,996	6,277,826	6,081,726	10,494,158
1st 10 months, 1953	28,967,532	41,274,081	657,909	70,899,522	70,517,472	10,941,065
1952	19,472,826	40,649,731	616,520	60,739,077	61,791,583	8,243,888
Truck and Bus Casings						
October, 1953	322,720	1,033,500	82,161	1,438,381	1,135,226	2,505,363
Change from previous month	—	—	—	+25.49%	+6.44%	−10.31%
September, 1953	334,122	746,894	65,176	1,146,192	1,066,578	2,793,238
1st 10 months, 1953	4,140,386	8,218,088	606,728	12,965,202	12,586,155	2,505,363
1952	4,430,377	7,462,240	680,413	12,573,030	13,338,981	2,577,525
Total Automotive Casings						
October, 1953	3,154,849	4,245,967	172,384	7,573,200	7,664,467	13,446,428
Change from previous month	—	—	—	+2.01%	+7.22%	+1.20%
September, 1953	2,837,196	4,437,650	149,172	7,424,018	7,148,304	13,287,396
1st 10 months, 1953	33,107,918	49,492,169	1,264,637	83,864,724	83,103,627	13,446,428
1952	23,903,203	48,111,971	1,296,933	73,312,107	75,130,564	10,821,413
Tractor-Implement Casings						
October, 1953	104,244	109,088	5,957	219,289	235,752	799,247
Change from previous month	—	—	—	−3.85%	−4.06%	+3.00%
September, 1953	124,793	94,750	8,535	228,078	245,728	775,971
1st 10 months, 1953	2,161,826	1,249,367	56,976	3,468,169	3,375,177	799,247
1952	2,321,582	1,173,206	92,633	3,587,421	3,674,850	779,632
Passenger, Motorcycle, Truck and Bus Inner Tubes						
October, 1953	3,156,385	2,696,350	107,271	5,960,006	5,752,422	10,904,188
Change from previous month	—	—	—	+4.20%	+1.71%	−3.40%
September, 1953	2,840,583	2,768,279	110,833	5,719,695	5,655,651	11,287,881
1st 10 months, 1953	33,129,893	32,485,101	719,333	66,334,327	65,244,099	10,904,188
1952	23,874,581	29,233,588	904,139	54,012,308	54,316,554	10,386,136
Camelback (Lbs.)						
October, 1953	—	30,177,268	1,184,000	31,361,268	27,430,735	27,156,048
Change from previous month	—	—	—	+25.54%	+16.13%	−7.97%
September, 1953	—	24,209,173	771,681	24,980,854	23,619,930	29,508,093
1st 10 months, 1953	—	223,935,856	6,978,215	230,914,071	229,790,873	27,156,048
1952	—	205,531,200	4,607,680	210,138,880	208,237,120	20,193,600

NOTE: Cumulative data on this report include adjustments made in prior months.
SOURCE: The Rubber Manufacturers Association, Inc., New York, N. Y.

CLASSIFIED ADVERTISEMENTS

SITUATIONS OPEN

PERSONNEL SPECIALISTS TO THE RUBBER INDUSTRY

Administrative, Sales, Technical and Production Supervision. Write or phone George C. Baird, Manager Technical Division

AKRON EMPLOYMENT SERVICE

Suite 607-08 Metropolitan Building, Akron, Ohio. POrtage 2-7641
Member: Chamber of Commerce, Ohio Private Employment Agencies Association and National Association of Personnel Consultants with 51 affiliate private agencies covering 26 states.

CHICAGO MANUFACTURER OPERATING INTERNATIONALLY has excellent opening for a rubber chemist experienced in cements, adhesives, coatings, heat seal compounds, etc. Replies should include educational background, experience, age, etc. Address Box No. 1412, care of INDIA RUBBER WORLD.

SALESMAN: EXTRUDED VINYLS AND POLYETHYLENE. EXperience and following in above or rubber trades essential. Address Box No. 1413, care of INDIA RUBBER WORLD.

SPONGE VINYL ENGINEER, FAMILIAR WITH ABOVE, TO head new department of old-line plastic company. Address Box No. 1414, care of INDIA RUBBER WORLD.

CHEMICAL ENGINEER — OPENINGS AVAILABLE FOR young men who really want to grow with an expanding organization. Development work on very interesting products—mechanical goods, all types of synthetic rubber and plastics. We want men who have had a few years' well-rounded experience, who have imagination and ambition. State all particulars. Enclose a picture if possible. Address Box No. 1415, care of INDIA RUBBER WORLD.

RUBBER SUPERVISOR WITH EXPERIENCE IN MOLDED RUBber products. Good opportunity for high-grade man with ability, knowledge of molding, and able to assume responsibility. Midwest location. Address Box No. 1416, care of INDIA RUBBER WORLD.

ASSISTANT PLANT MANAGER FOR SMALL RUBBER SHOP. Specializing in molded parts, linings, rolls. Know complete rubber routine, compounding, calendering, molding, extruding, and ability to expand existing equipment and procedures; this knowledge of equipment is essential. If your past training is diversified enough and you are quality minded and keep a clean progressive shop, this is an excellent opportunity to become a working and financial part of a going and growing organization; moderate salary and bonus stock plan. Located mid-south. State full qualifications and starting date. Address Box No. 1417, care of INDIA RUBBER WORLD.

CHEMIST: GRADUATE CHEMIST THOROUGHLY EXPERIenced in chemically blown sponge. An excellent opportunity with a Triple A rated company located in the Midwest. This is a permanent position for a well-qualified man. Please give full particulars, including education and experience, in reply. Address Box No. 1418, care of INDIA RUBBER WORLD.

FLOORING MANUFACTURER REQUIRES THE SERVICES OF a man in an advisory or consultant capacity. The man we are looking for must be familiar with the machinery and mechanical techniques required for manufacturing molded flexible vinyl floor tile. Address Box No. 1419, care of INDIA RUBBER WORLD.

WIRE & CABLE TECHNOLOGIST

Chemist or engineer having broad experience in rubber technology and cable manufacture. Responsible position in expanding engineering department. Compensation commensurate with experience. Write in confidence to Executive Engineer, Western Insulated Wire Co., 2425 E. 30 Street, Los Angeles 58, Calif.

EXPERIENCED FOAM RUBBER CHEMIST

to set up and operate a small molded goods plant in the Chicago or Los Angeles area. Old established firm. In replying please give age, training, experience, salary expected. Address Box No. 1429, care of INDIA RUBBER WORLD.

ATTENTION: CHEMIST CONSULTANT. A NEW CANADIAN rubber company requires formulae and methods for the manufacture of Bath Sponges and Sponge Rug Underlay; also an all crude rubber garden hose stock competitively priced. Can you help us? Address Box No. 1430, care of INDIA RUBBER WORLD.

SITUATIONS WANTED

OPPORTUNITY DESIRED. EXPERIENCED IN SMALL BUSIness management, sales, and broad technical work. Specialized in large- and small-plant product development, production problems, etc., primarily rubber field. Age 39. Prefer warm climate; foreign considered. Address Box No. 1420, care of INDIA RUBBER WORLD.

CHEMIST: ONE YEAR'S PRODUCTION EXPERIENCE IN chemically blown sponge rubber, three years' research and development in field of aging and test methods. Age 26, married, family. Address Box No. 1421, care of INDIA RUBBER WORLD.

RUBBER TECHNICIAN, DESIRES TO RELOCATE. OVER TWENty years' experience in the wire and cable industry. Experience includes development and compounding, rubber and plastic extruding, laboratory control, factory control. Can handle people, laboratory and factory coordination. Reliable and steady. Address Box No. 1422, care of INDIA RUBBER WORLD.

COATING, LAMINATING, EXTRUSION, IMPREGNATION, gravure printing, foil rolling, vacuum metal evaporation and refining. Rubber, plastics, thermosets, and latex. Aluminum, papers, films, textiles. Classified defense and commercial. Extreme temperature conditions. At present chemical director, AaA-1 multi-plant company which operates in all these fields. Wish to change. Available for two days per week on permanent basis. Development, production, or marketing. Individual problem, or general supervision or special conditions. Address Box No. 1423, care of INDIA RUBBER WORLD.

MACHINERY & SUPPLIES FOR SALE

BAKER PERKINS #14 JEM VACUUM MIXER, 50-GAL. WORKing cap., double-arm, sigma blade, jacketed shell. Kux model 25 Rotary Pellet Presses, 21 and 25 punch. Stokes Rotary Pellet Presses model RD-3 (16 punch) and model RDS-3 (15 punch). Ball & Jewell #1½ stainless-steel rotary cutter. Mikro Pulverizers #1-SH, #1-SI, #2-TH, and #2-SI. Large stock steel and stainless-steel tanks and kettles. PERRY EQUIPMENT CORP., 1424 N. 6th St., Phila. 22, Pa.

MACHINERY AND SUPPLIES FOR SALE (Continued)

FOR SALE: FARREL 16" X 48" AND 15" X 36", 2-ROLL RUBBER mills, and other sizes up to 84". Also new and used lab. 6" x 12" & 6" x 16" mixing mills and calenders. Six American Tool 300-gallon Churns. Extruders 1" to 6". Baker-Perkins Jacketed Mixers 100, 50, and 9 gals., heavy-duty double arm. 350-ton upstroke Hydr. Press 22" x 24" platens. 325-Ton upstroke 42" x 24" platens. Brunswick 200-ton 21" x 21" platens. Large stock of hydraulic presses from 12" x 12" to 48" x 48" platens from 50 to 2,000 tons. Hydraulic Pumps and Accumulators. Rotary Cutters. Stokes Automatic Molding Presses. Single Punch & Rotary Preform Machines. Banbury Mixers, Crushers, Churns, Rubber Bale Cutters, etc. SEND FOR SPECIAL BULLETIN. WE BUY YOUR SURPLUS MACHINERY. STEIN EQUIPMENT CO., 107 - 8th St., Brooklyn 15, N. Y. STerling 8-1944.

FOR SALE: FOLLOWING NO. 11 BANBURY PARTS WHICH WE must dispose of since it is not our line of work, and we need the space: 6 Rotors (3 sets) 1 set complete built up ready for machining, $1,200.00 a set; 2 Side jackets (spray type), $600.00 each; 5 End Frames, $500.00 each; 2 Doors and cylinders, $750.00 each; 4 Connecting gears (2 sets), $200.00 each; 1 Bull gear (new), $750.00. Also miscellaneous bearings, forks, rings, etc. Also set of new #27 Banbury connection gears, $800.00 a set. Will consider reduction in price for sale as one lot. Address Box No. 1424, care of INDIA RUBBER WORLD.

USED RUBBER MILL EPUIPMENT

1—REBUILT BOLLING 8 x 16" 4-ROLL VERTICAL STACK CALender complete, equal to new; 1—Bolling size 3 Intensive Mixer complete with 75 HP motor and all accessories, located West Coast; 1—16 x 45 Farrel top cap mill drive 75 HP new drive; 1—16 x 40 Birmingham Mill with drive; 1—12 x 30 Birmingham mill with drive; 10—16 x 24", 10" and 12" ram hydraulic presses, single 8" opening, $675.00 each. Misc. reducers and motors—50-200 HP, #2, #3, and #4 Royle Tubers. Priced for quick sale. Bolling & Son, 3190 East 65th Street, Cleveland 27, Ohio. Michigan 1-2850.

FOR SALE—IMMEDIATE DELIVERY: ELEVEN (11) 40" McNEIL Dual-Tire Curing Presses. Five (5) Model 230-40-16. Six (6) Model 230-40-16-12. Also six (6) additional Model 230-40-16 available approximately January, 1954. All above complete with timer, operating valves and are in good operating condition. Can be inspected at site, if desired. Subject to prior sale. Seller reserves right to reject any or all bids. Address Box No. 1425, care of INDIA RUBBER WORLD.

PICKER X-RAY, COMPLETE WITH NECESSARY LEAD INSUlation, 110 Volts. Style 752, Serial 303, three Belts. Write P. O. Box 8, Hagerstown, Md.

FOR SALE: 1 10" X 20" TWO-ROLL RUBBER MILL, MD. 1 6' X 12' vulcanizer, quick-opening door. 1 Farrel 18" x 48" two-roll mill, MD. Chemical & Process Machinery Corp., 148 Grand Street, New York 13, N.Y.

TANKS FOR SALE: TANK CAR SHELLS, FIVE (5) 8000-GALLON capacity—one (1) 7000-gallon—Riveted—With Coils—Good Condition—Used for Vegetable Oil Storage—Price $400.00 each—F.O.B. our Plant. Contact H. P. Dmerjian, Baker Castor Oil Company, 40 Avenue "A," Bayonne, N. J.

FOR SALE

Farrel Ansonia 20 x 48 3-roll calender, motor drive, variable speed controls, all heringbone gears, in A-1 condition.
Farrel Ansonia 15 x 36 2-roll rubber mill, motor drive.

HANDY MFG. CO.

80 Webster St., Worcester, Mass.

BUYING-SELLING All kinds of *used* machinery for the Rubber and Allied Industries.

OFFERING NEW MACHINERY Hydraulic Presses, Laboratory Mills and Presses, Sponge Rubber Vulcanizing Presses, Drilled Steel Steam Platens, Rubber Bale Cutters guillotine type, Vulcanizers with quick opening doors, etc.

HIGH EFFICIENCY IN QUALITY, PRICE AND DELIVERY TIME

ERIC BONWITT 431 S. Dearborn Street Chicago 5, Ill.

AIR BAG BUFFING MACHINERY

STOCK SHELLS **HOSE POLES**

MANDRELS

NATIONAL SHERARDIZING & MACHINE CO.

868 WINDSOR ST. HARTFORD, CONN.

Representatives
Akron San Francisco New York

HOWE MACHINERY CO., INC.

30 GREGORY AVENUE PASSAIC, N. J.

Designers and Builders of

"V" BELT MANUFACTURING EQUIPMENT

Cord Latexing, Expanding Mandrels, Automatic Cutting, Skiving, Flipping and Roll Drive Wrapping Machines.

ENGINEERING FACILITIES FOR SPECIAL EQUIPMENT

Call or write.

U. S. Imports, Exports, and Reexports of Crude and Manufactured Rubber

Exports of Domestic Merchandise

	August, 1953 Quantity	August, 1953 Value
UNMANUFACTURED, LBS.		
Chicle and chewing gum bases	280,528	$105,895
Balata, gutta percha, etc.	750	1,905
Synthetic rubbers		
GR-S type	1,829,723	492,581
Butyl	7,500	1,677
Neoprene	2,005,068	902,872
Nitrile type	575,200	296,737
Other	53,393	51,190
Reclaimed rubber	1,877,520	164,213
Scrap rubber	2,114,026	41,643
TOTALS	8,743,708	$2,058,713
MANUFACTURED		
Rubber cement ... *gals.*	50,052	$115,803
And rubberized fabric ... *sq. yds.*	172,180	178,528
Clothing	......	105,736
Footwear		
Boots and shoes ... *prs.*	14,004	30,419
Rubber-soled canvas shoes ... *prs.*	9,784	20,114
Heels ... *doz. prs.*	66,167	80,314
Soles, soling, toplift sheets ... *lbs.*	830,643	210,013
Gloves and mittens ... *doz. prs.*	13,568	56,375
Drug sundries	......	156,154
Toys, balls, novelties	......	87,186
Hard rubber goods		
Battery boxes ... *no.*	17,422	30,041
Other electrical goods ... *lbs.*	54,232	39,906
Other	......	28,014
Rubber tires and casings		
Truck and bus ... *no.*	49,266	2,113,569
Auto and motorcycle ... *no.*	92,731	1,046,059
Aircraft ... *no.*	4,394	242,948
Off-the-road ... *no.*	6,954	941,051
Farm tractor ... *no.*	4,390	198,742
Implement ... *no.*	1,132	26,695
Other ... *no.*	4,331	20,812
Inner tubes		
Auto ... *no.*	28,073	51,406
Truck and bus ... *no.*	28,999	131,645
Aircraft ... *no.*	1,866	11,886
Other ... *no.*	3,982	28,622
Solid tires: truck and commercial ... *lbs.*	1,737	38,090
Tire repair material		
Camelback ... *lbs.*	481,471	144,919
Other ... *lbs.*	225,328	216,483
Tape, except medical and friction ... *lbs.*	31,477	23,730
Belting		
V-type, auto, fan ... *lbs.*	75,672	100,384
Transmission		
V-type ... *lbs.*	67,571	126,825
Flat belts ... *lbs.*	20,124	27,362
Conveyor and elevator ... *lbs.*	63,101	55,720
Other ... *lbs.*	300	370
Hose		
Molded and braided ... *lbs.*	244,574	218,133
Wrapped and hand built ... *lbs.*	101,802	108,593
Other hose and tubing ... *lbs.*	91,974	94,907
Packing		
Sheet type ... *lbs.*	43,534	28,630
Other ... *lbs.*	85,251	142,965
Tiling and flooring ... *lbs.*	155,297	44,046
Mats and matting ... *lbs.*	337,250	113,762
Thread: bare ... *lbs.*	26,088	44,315
Textile covered ... *lbs.*	9,946	30,622
Compounded rubber for further manufacture ... *lbs.*	511,237	207,402
Other rubber manufactures	......	465,670
TOTALS	......	$8,184,966
GRAND TOTALS, ALL RUBBER EXPORTS	......	$10,243,679

Reexports of Foreign Merchandise

	August, 1953 Quantity	August, 1953 Value
UNMANUFACTURED, LBS.		
Crude rubber	1,269,438	$348,745
Balata, gutta percha, etc.	5,700	2,823
Scrap rubber	19,958	8,582
TOTALS	1,295,096	$360,150

SOURCE: Bureau of the Census, United States Department of Commerce, Washington, D. C.

Imports for Consumption of Crude and Manufactured Rubber

	August, 1953 Quantity	August, 1953 Value
UNMANUFACTURED, LBS.		
Crude rubber	84,016,589	$17,712,672
Latex	14,892,562	3,970,600
Balata	378,916	75,627
Jelutong or Pontianak	217,077	103,480
Gutta percha	15,878	13,743
Crude chicle	7,900	3,160
Synthetic rubber	1,276,858	360,760
Reclaimed rubber	223,997	22,557
Scrap rubber	2,167,385	69,449
TOTALS	103,197,162	$22,332,048
MANUFACTURED		
Rubber tires		
Auto, etc. ... *no.*	3,743	$191,397
Bicycle ... *no.*	11,408	8,954
Inner tubes		
Auto, etc. ... *no.*	420	1,306
Footwear		
Boots ... *prs.*	28,806	80,639
Shoes and overshoes ... *prs.*	55,969	48,449
Rubber-soled canvas shoes ... *prs.*	7,552	4,243
Athletic balls		
Golf ... *no.*	28,136	7,120
Tennis ... *no.*	37,044	9,386
Other ... *no.*	8,214	1,322
Toys	......	35,351
Hard rubber goods		
Combs ... *no.*	8,360	1,234
Other	......	10,010
Rubberized printing blankets ... *lbs.*	527	895
Rubber and cotton packing ... *lbs.*	3,591	6,315
Gasket and valve packing	......	16,839
Molded insulators	......	2,984
Belting ... *lbs.*	2,665	5,896
Hose and tubing	......	17,789
Gloves ... *prs.*	30,924	5,544
Nipples and pacifiers ... *gr.*	4,075	5,133
Instruments ... *doz.*	24,418	33,849
Heels and soles ... *lbs.*	11,260	8,294
Bands ... *lbs.*	68	48
Other	......	1,867
Gutta percha manufactures ... *lbs.*	20	256
Synthetic rubber products	......	6,805
Other soft rubber goods	......	159,052
TOTALS	......	$670,977
GRAND TOTALS, ALL RUBBER IMPORTS	......	$23,003,025

Foreign Trade Opportunities

The firms and industries listed below recently expressed their interest in buying in the United States or in United States representations. Additional information concerning each import or export opportunity, is available to qualified United States firms and may be obtained upon inquiry from the Commercial Intelligence Unit of the United States Department of Commerce, Washington, D. C., or through its field offices, for $1 each. Interested United States companies should correspond directly with the concerns listed concerning any projected business arrangements.

Export Opportunities

Modern Chemicals (Pty.), Ltd., P. O. Box 520, Johannesburg, Union of South Africa: synthetic resins, molding powders, synthetic rubbers, and chemicals.

P. R. Waibel, Zwinglistrasse 12, Bern, Switzerland: stationers' supplies including fountain pens, erasers, and plastic ash trays.

Otsuka Seika Kabushiki Kaisha (Otsuka Shoe Mfg. Co., Ltd.), 19 Kaigandori I-chome, Shiba, Minato-ku, Tokyo, Japan: Shoe machinery for manufacturing shoes with composition or rubber soles.

Domingo Franchi and Elias Scampini, Av. Boggiani esq. Dr. Weiss, Asuncion (Villa Morra), Paraguay: electrical equipment and supplies.

Import Opportunities

Herboristerie Principale, 35 Rue des Granges, Besancon (Doubs) France: maternity corsets.

Trade Lists Available

The Commercial Intelligence Division recently published the following trade lists, of which mimeographed copies may be obtained by firms domiciled in the United States from this Division and from United States Department of Commerce Field Offices. The price is $1 a list for each country.

Aircraft & Aeronautical Supply & Equipment Importers & Dealers: Honduras.

Automotive Vehicle & Equipment Importers & Dealers: Argentina; Honduras.

Chemical Importers & Dealers: British Honduras; Egypt.

Boot & Shoe Manufacturers: India; Malaya.

Electrical Supply & Equipment Importers & Dealers: Thailand.

Plastic Material Manufacturers, Molders, Laminators & Fabricators: Greece; Hong Kong; Portugal.

Rubber Goods Manufacturers: Costa Rica.

Sporting Goods, Toy & Game Importers: Costa Rica; Turkey.

Compounding Ingredients—Price Changes and Additions

Accelerator-Activators, Organic

Emersol 210 Elaine	*lb.*	$0.12	$0.155
Laurex	*lb.*	.33	.37

Plasticizers and Softeners

Baker AA Oil	*lb.*	.195	.24
Crystal O Oil	*lb.*	.21	.255
Processed oils	*lb.*	.215	.235
Cabflex DDA	*lb.*	.46	.5175
DDB	*lb.*	.36	.4075

United States Rubber Statistics—September, 1953

(All Figures in Long Tons, Dry Weight)

	New Supply			Distribution		
	Production	Imports	Total	Consumption	Exports	Month-End Stocks
Natural rubber, total	0	52,498	52,498	39,721	790	110,248
Latex, total	0	6,127	6,127	5,504	0	11,370
Rubber and latex, total	0	58,625	58,625	45,225	790	121,618
Synthetic rubbers, total	*51,562 †9,115	1,068	61,745	58,652	2,223	167,625
GR-S types‡	*44,847 †110	1,012	45,959	46,267	702	132,453
Butyl	*6,715	56	6,771	5,587	0	21,280
Neoprene‡	†6,943	0	6,943	5,497	1,065	9,671
Nitrile type‡	†2,062	0	2,062	1,391	456	4,221
Natural rubber and latex, and synthetic rubbers, total	60,677	59,693	120,370	103,877	3,013	289,243
Reclaimed rubber, total	23,360	109	23,469	22,409	894	30,147
GRAND TOTALS	84,037	59,802	143,839	126,286	3,907	319,390

*Government plant production.
†Private plant production.
‡Includes latices.
SOURCE: Chemical & Rubber Division, NPA, United States Department of Commerce, Washington, D. C.

GOOD USED MACHINERY

WANTED
YOUR IDLE EQUIPMENT

1—F. B. 24" x 84" Mill, w.c. bearings, red. drive & 240 H.P., A.C., motor.
1—F. B. 32" x 92" inverted-L 4-roll Calender, red. drive, D.C. varispeed motor.
1—Royle #4 Extruder, motor driven.
1—F. B. 6" x 13" self-contained 3-roll Calender, m.d.
1—6" x 12" Laboratory Mill, m.d.
2—Ball & Jewell #2 Rotary Cutters; 1—#1; 1, with 3 h.p. motor.
3—#28 Devine Vac. Shelf Dryers, 19-59" x 78" shelves, complete.
Also other sizes Hydraulic Presses, Tubers, Banbury Mixers, Mills, Vulcanizers, Calenders, Pellet Presses, Cutters.

PHONE—WIRE—WRITE • *Send us your inquiries*

Consolidated Products Company, Inc.

Observer Highway & Bloomfield St., Hoboken, N. J.
N.Y. Tel.: BArclay 7-0600 HOboken 3-4425
Cable Address: Equipment Hoboken, N.J.
"Our 37th Year"

Economical **NEW** Efficient

Mills - Spreaders - Churns
Mixers - Hydraulic Presses
Calenders

...GUARANTEED...

Rebuilt Machinery for Rubber and Plastics

LAWRENCE N. BARRY
41 Locust Street Medford, Mass.

USED MACHINERY
FOR SALE

1—Ambaco Model 3A Continuous Baler.
2—Thropp 2-roll Rubber Mills, 18"x50".
1—Link-Belt Steel Roto Louvre Dryer, size 7½'x20'.
1—Adamson Vulcanizer, 2' x 12' with quick opening door.
2—Divine Vacuum Shelf Dryers—12 Shelves.
1—Paul O. Abbe #2 Master Rotary Cutter with Ball Bearings.
1—Welding Engr. Stainless Steel #2 Extruder.
14—Baker Perkins Steel Jacketed Mixers—100 gals.—Type 15 JIM 2. Late type construction.
1—Baker Perkins Stainless Steel double-arm jacketed mixer, Sigma blade, 9 gal.

WE ARE INTERESTED IN PURCHASING ALL TYPES OF RUBBER machinery consisting of mills, Banbury mixers, extruders, calenders, vulcanizers, etc. and also complete plants.

R. GELB & SONS Inc.
STATE HIGHWAY No. 29, UNION, N.J.
UNIONVILLE-2-4900

AVAILABLE IMMEDIATELY

2—24"x26"x84" Birmingham Heavy Duty Mills
Enclosed Herringbone reduction drive, 200 HP Motor and controls. Good condition, can be inspected in present location.
1—22"x60" Farrel 3 roll Calender, 125 HP Motor and enclosed Herringbone drive. Reconditioned throughout.
1—#9 Banbury Mixer complete with motor, drive and controls. Rebuilt and reconditioned, can be inspected before assembly.
#9 Banbury—As Is, Where Is. Inspection possible in operating location. (Western Area.) Best offer accepted for a quick sale.
Banbury Bodies—2-#9—1-#11 Rebuilt and reconditioned.

The above equipment has become available within the last 60 days and is priced for a quick sale. * WIRE * WRITE * CALL *

AVAILABLE AKRON, OHIO WAREHOUSE

Mills	Grinding Equipment	Presses
Extruders	Motors	New ARMACO 24"x24" 18" Ram
Calenders	All types & size Gears.	Used Presses
Cutters		Platens
Conveyers	Hyd. Equipment	Lab. Mills (New)

WE ARE INTERESTED IN PURCHASING YOUR SURPLUS RUBBER WORKING EQUIPMENT.
BEST PRICES FAST ACTION TRADE

We have buyers for complete rubber plants, all types of products. Send description, machinery inventory and sales record. All details held in strict confidence.

ARMACO

AKRON RUBBER MACHINERY CO., INC.
200 South Forge St. • P. O. Box 88 • Akron 9, Ohio • PHONE HEmlock 9141

RUBBER HARDNESS
THE LANGUAGE OF THE RUBBER INDUSTRY SINCE 1915

DUROMETER
VARIOUS MODELS FOR TESTING THE ENTIRE RANGE

TECHNICAL DATA ON REQUEST

THE SHORE INSTRUMENT & MFG. CO., INC.
90-35 VAN WYCK EXPRESSWAY
JAMAICA 2, N. Y.

NEW and REBUILT MACHINERY
Since 1891

L. ALBERT & SON

Trenton, N. J., Akron, Ohio, Chicago, Ill., Los Angeles, Calif.

GUARANTEED REBUILT MACHINERY
IMMEDIATE DELIVERIES FROM STOCK

MILLS, CALENDERS, TUBERS — HYD. PRESSES, PUMPS, MIXERS
VULCANIZERS, ACCUMULATORS — CUTTING MACHINES, PULVERIZERS

UNITED

UNITED RUBBER MACHINERY EXCHANGE
183-189 ORATON ST. CABLE "URME" NEWARK 4, N. J.

MACHINERY & SUPPLIES WANTED

WANTED: PLANT OR MACHINERY INCL. RUBBER MILLS, Calenders, Mixers, Banbury Mixers, Extruders, Grinders, Cutters, Hydraulic Presses, Injection Molding Machines. CONSOLIDATED PRODUCTS CO., INC., 13-16 Park Row, New York 38, N. Y. BArclay 7-0600.

1—60" OR 65" WIDE ROLLER EMBOSSING MACHINE OR EMbossing roller, preferably kidgrain. Address Box No. 1427, care of INDIA RUBBER WORLD.

WANTED: 500-G.P.M. PUMP, ELECTRIC DRIVEN HORIZONTAL shaft for cold water at 75 P.S.I. Also 9,000- or 10,000-gal. pressure tank, 100 P.S.I. test. Must be in good condition and within 500 miles. Address Box No. 1428, care of INDIA RUBBER WORLD.

MISCELLANEOUS

FOR SALE: REFINED BALED CAMELBACK ENDS AND trimmings 48 x 20 — approximately 35 to 40 lbs. per bale ready for shipment. Suitable floor mats, bath mats, truck flaps, many other uses. Prices on request. Address Silver Moon Tire and Wheel Co., 3301 Jensen Drive, Houston, Texas.

BUSINESS OPPORTUNITIES

FOR SALE: BRIDGEPORT-NEW HAVEN, CONNECTICUT AREA—near Boston Post Road, one story, reinforced concrete and brick factory, over 10,800 square feet. High-pressure boiler, electricity, gas, and water, ideal for the manufacture of rubber, has roll rubber mills installed. Several acres of land for industrial expansion. Address Box No. 1426, care of INDIA RUBBER WORLD.

Custom Mixing RUBBER-PLASTICS

We do milling and compounding of all types—black or color—master batches

All mixing done under careful supervision and laboratory control.

Phone: Butler 9-0400

Pequanoc Rubber Co.
MANUFACTURERS OF RECLAIMED RUBBER
MAIN SALES OFFICE and FACTORY: BUTLER, N. J.

Custom Mixing

55 YRS. KNOW-HOW
NEW FACILITIES—
HARD & SOFT RUBBER FORMULAS

✓ MASTER BATCHES
✓ MILL MIX
✓ BANBURY—UP TO #11
✓ DUST GRINDING

Call Trenton 2-7153

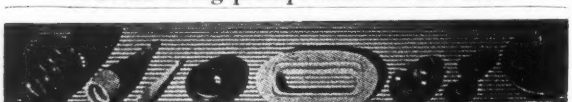
STOKES MOLDED PRODUCTS, INC.
CUSTOM MOLDERS—HARD RUBBER & PLASTICS
TRENTON 4, N. J.

Black White Colors
CUSTOM RUBBER MILLING
Preparation of master batches and complete compounds of every type to meet your specifications and requirements.
ABC RUBBER CO.
1451 So. Sangamon St., Chicago 8, Illinois
Telephone: Taylor 9-0644

MANUFACTURING BUSINESS WANTED
We are now manufacturing over $20,000,000 in various lines and wish to expand by acquisition of assets or stock of one or more industrial companies. In our negotiations the sellers' problems and wishes will receive full consideration. Present personnel will normally be retained.
Address all replies "confidentially" C. J. GALE, Sec., 233 Broadway, New York 7, N. Y. RE 2-9360

The Classified Ad Columns of INDIA RUBBER WORLD bring prompt results at low cost.

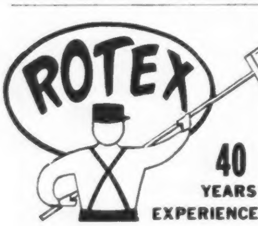
MIXING
To Your Specification
K. B. C. INDUSTRIES, INC. NEW HAVEN, CONN.
881 State Street Tel: State 7-5662
Otto J. Lang, General Manager



INDUSTRIAL RUBBER GOODS
BLOWN — SOLID — SPONGE
FROM NATURAL, RECLAIMED, AND SYNTHETIC RUBBER
THE BARR RUBBER PRODUCTS CO. SANDUSKY OHIO

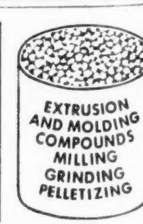
Rubber Plastic Synthetics
Precision Workmanship
CALENDERING & MIXING
Rubber & Plastics: Calendering, Mixing, Grinding & Pulverizing
AS YOU WANT IT. QUICK SERVICE
The Saniseal Mfg. Co. P. O. Box 1315
New Haven, Conn. Tel. Spruce 7-3437

BROCKTON TOOL COMPANY
Central Street QUALITY MOULDS FOR ALL PURPOSES South Easton, Mass.
THE FIRST STEP — A QUALITY MOULD



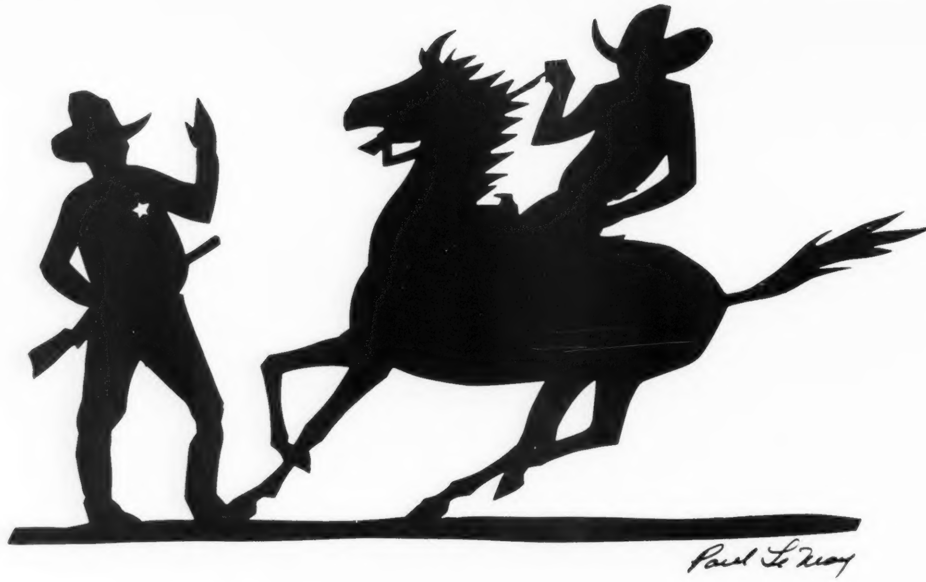
40 YEARS EXPERIENCE

SCRAP
PLASTICS: POLYETHYLENE • VINYL • STYRENE ACETATE • BUTYRATE
RUBBER: UNCURED COMPOUNDS • SCORCHED STOCKS
ALL TYPES OF FACTORY WASTE FOR RECLAIMING PURPOSES
ROTEX RUBBER COMPANY, INC.
1-23 JABEZ ST. NEWARK 5, N. J. TEL. HUMBOLDT 2-8000



INDEX TO ADVERTISERS

This index is maintained for the convenience of our readers. It is not a part of the advertisers' contract and India Rubber World *assumes no responsibility to advertisers for its correctness.*



...the law

One fundamental law of economics specifies . . . for a successful operation always be assured adequate supplies of top-quality raw materials at competitive prices.

The Sid Richardson Carbon Co. meets the spirit and letter of this law for its customers with:

1. Its own nearby natural resources to assure continuous supply
2. Plant separated into individual units to make specification products
3. Economical to use channel blacks

For continued success use **TEXAS "E"** or **TEXAS "M"** channel blacks.

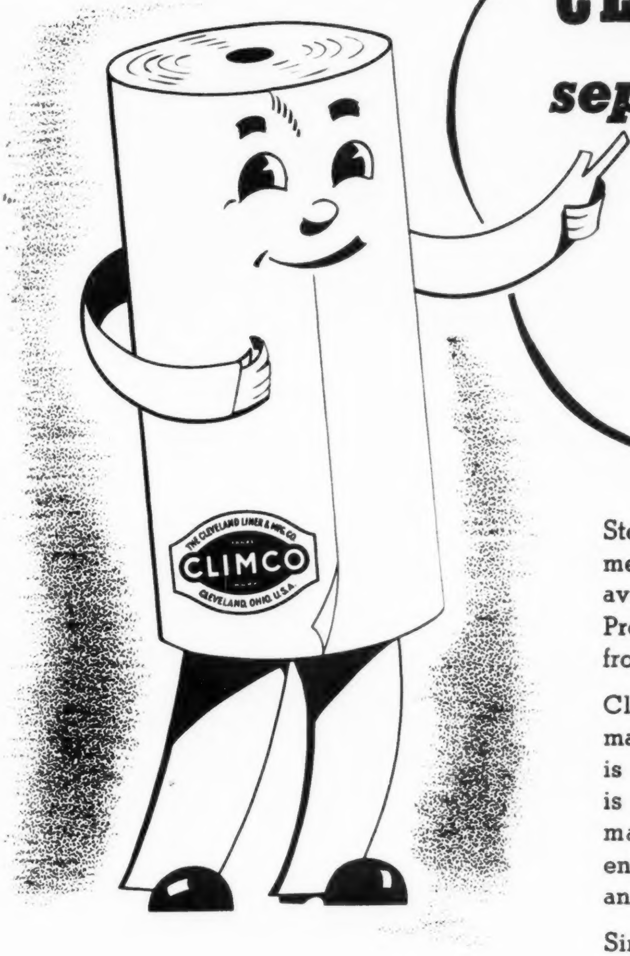
TEXAS CHANNEL BLACKS

Sid Richardson
CARBON CO.
FORT WORTH, TEXAS

GENERAL SALES OFFICES
EVANS SAVINGS AND LOAN BUILDING
AKRON 8, OHIO

MR. CLIMCO SAYS . . . .

"CLIMCO LINERS *separate perfectly from the stock*"



Stock adhesions at any point in production mean time lost and extra expense. You can avoid such headaches by using Climco Processed liners that can be readily peeled from the stock without sticking.

Climco Processing of your liners assures many other profitable advantages: Liner life is greatly increased, tackiness of the stock is preserved, and gauges are more easily maintained. Latitude in compounding is enlarged, lint and ravelings are eliminated and horizontal storage is facilitated.

Since 1922 Climco Processed Liners have proved their worth to the rubber industry. Give them a trial in your plant.

THE CLEVELAND LINER & MFG. CO.
5508 Maurice Ave. • Cleveland 27, Ohio, U.S.A.
Cable Address: "BLUELINER"

ILLUSTRATED LINER BOOKLET

Tells all about Climco Liners and Linerette and how to get better service from liners. Write for your copy now.

LINERETTE INTERLEAVING PAPER
Treatment Contains
NO OIL OR WAX
Samples on Request

CLIMCO
PROCESSED LINERS
Serving the Rubber Industry for 32 Years

New York City
53 East 34th St.
Murray Hill 5-8388

Akron, Ohio
790 E. Tallmadge
HEmlock 4-4124

Boston, Mass.
738 Statler Bldg.
LIberty 2-2717

E. St. Louis, Ill.
14th & Converse
BRidge 5326

A. Schulman, Inc., Ltd.
Ibex House Minories
LONDON E. C. 3,
ENGLAND
Telephone: Royal 4989

A. Schulman (USA) GmbH
Bolco Building
Hinuberstrasse 18
HANOVER, GERMANY
Telephone: 21551

scrap rubber

plastics

crude rubber

hard rubber dust

A. Schulman Inc.

our 25th year